

## CURRICULUM VITAE: JOHN ANTHONY SZIVEK

### 2. Chronology of Education:

1985		<b>Post-Doctoral Fellow</b> , with Dr. Dennis Smith, Biomaterials Dept., College of Dentistry, Univ. of Toronto, Toronto, Ontario, Canada
1984	Degree Awarded:	<b>Ph.D.</b> , Dept of Metallurgy and Material Science, University of Toronto, Toronto, Ontario, Canada
	Dissertation:	A Quantitative Study of the Effect of Strain Redistribution on Bone Remodelling
	Advisor:	Drs. Robert M. Pilliar and George C. Weatherly
1979	Degree Awarded:	<b>Master of Applied Science</b> , Dept Metallurgy and Material Science University of Toronto, Toronto, Ontario, Canada
	Thesis Topic:	Stress Redistribution and Bone Remodelling: A Study Using Various Stiffness Bone Plates
	Advisor:	Drs. Robert M. Pilliar and George C. Weatherly
1977	Degree Awarded:	<b>Bachelor, Applied Science</b> , Dept Metallurgy and Materials Science <b>Graduated with Honors</b> , specializing in Mechanical Properties and Materials Fabrication
	Thesis Topic:	Controlling Weldability of 7075 Aluminum Alloys
	Advisor:	Drs. Carl T. Aust and John G. Rutter

### 3. Chronology of Employment: Academic and Professional Appointments

Currently	Professor (with tenure), Dept. of Orthopaedic Surgery
2011-2015	Chair Biomedical Engineering Graduate Interdisciplinary Program
2005-present	Professor (tenured), Dept. of Orthopaedic Surgery
2003-present	William and Sylvia Rubin Chair of Orthopaedic Research
2001-present	Research Faculty, Bio5, Institute for Collaborative Bioresearch
1998-present	Faculty, Interdisciplinary Biomedical Engineering Program
1998-05	Research Professor, Dept. of Orthopedic Surgery Adjunct Associate Professor, Dept. of Aerospace and Mechanical Engineering Adjunct Associate Professor, Dept. of Materials Science and Engineering Director, Orthopedic Research Laboratory, University of Arizona Senior Scientist, Arizona Arthritis Center
1996-97	Research Professor, Dept. of Surgery, Adjunct Associate Professor, Dept. of Aerospace and Mechanical Engineering Adjunct Associate Professor, Dept. of Materials Science and Engineering Director, Orthopedic Research Laboratory, University of Arizona Senior Scientist, Arizona Arthritis Center
1994-95	Associate Research Professor, Dept. of Surgery, Adjunct Associate Professor, Dept. of Aerospace and Mechanical Engineering Adjunct Associate Professor, Dept. of Materials Science and Engineering Director, Orthopedic Research Laboratory, University of Arizona Senior Scientist, Arizona Arthritis Center
1993-94	Associate Research Professor, Dept. of Surgery, Adjunct Associate Professor, Dept. of Aerospace and Mechanical Engineering Director, Orthopedic Research Laboratory, University of Arizona Senior Scientist, Arizona Arthritis Center
1990-92	Associate Research Professor, Dept. of Surgery, University of Arizona Director, Orthopedic Research Laboratory

- 1988-90 Head, Experimental Stress Analysis, and Director,  
Electron Microscopy & Bone Histomorphometry, Harrington Arthritis Research Cent  
Adjunct Prof., ASU & Lecturer, Maricopa County Res. Prog, County Hospital
- 1985-88 Research Scientist, Harrington Arthritis Research Center  
Adjunct Prof., Arizona State University & Lecturer, Maricopa County Res Program
- 1977 Research Assistant to Dr. RM Pilliar, Metallurgy Dept. Ontario Research Foundation
- 1976 Laboratory Assistant, Failure Analysis Section of Metallurgy Dept., Ontario Hydro
- 1975 Guess Scholarship funded a Researcher Assistantship in Dept. Metallurgy and  
Mat. Science, University of Toronto,

#### 4. Honors, Awards and Society Memberships

- 2017 – 2018 Chair, University Biology Research Program (U.B.R.P.) Governing Board
- 2016 **Presidential Recognition Letter** from UA President for media coverage of tissue engineering work utilizing stem cells
- 2015 Graduate College **Service Recognition Award for 4 yrs. service as Chair of Biomedical Engineering Graduate Interdisciplinary Program** and for 3 yrs. service on **Graduate Interdisciplinary Programs Advisory Council**
- 2011-2012 **President's Inclusive Excellence Award**, University of Arizona
- 2008-2009 **Outstanding Faculty Mentor Award**, University Biology Research Program
- 2005 **Investigator of the Year Award**, UAC, University of Arizona
- 2003 Awarded **William and Sylvia Rubin Chair in Orthopaedic Research**
- 2003 **Mentor of the Year** award, **National Science Foundation**, Louis Stokes Alliances for Minority Participation (**LSAMP**), WAESO Chapter
- 2000 **Cover Article** J. Applied Biomaterials, Volume 53:3, 211-215, 2000.
- 1998 **Faculty Mentor Honor Roll**, Department of Surgery
- 1997 Appointed to **Public Policy and Advocacy Committee of Arthritis Foundation** (Arizona Chapter)
- 1997 **Alberta Visiting Professor Award**  
Awarded through Alberta Heritage Foundation
- 1996 Appointed to **Governors Advisory Council** on Arthritis and Musculoskeletal Diseases
- 1995 **Louis J. Kettel, Outstanding Faculty Mentor Award**, for Medical Student Mentoring
- 1992 Awarded **Outstanding Presentation** at The Knee Society, Philadelphia PA  
Paper selected to rep US at International Knee Society meeting in Copenhagen, June 93
- 1992 Awarded **Outstanding Publication** of 1992, J. of Investigative Surg., 5, pp. 91-108.
- 1988 Board of Visitors Award, St. Luke's Hospital, Phoenix,
- 1980-1984 Ontario Graduate Scholarship (Annually from 1980 to 1984)
- 1979-1984 University of Toronto Open Scholarship (Annually from 1979 to 1984)
- 1979 Award for student paper at Canadian Biomaterials Society, Toronto, Ontario
- 1977 Graduated Bachelor of Applied Science with Honors, University of Toronto
- 1976 G. Guess Summer Scholarship Award to carry out metal solidification studies
- 1973 Ontario Scholarship for Scholastic Excellence (for Graduating with High Honors)
- 1973 High School Chemistry Scholastic Achievement Award Intensive Senior Chemistry
- 1972 High School Biology Scholastic Achievement Award Intensive Senior Biology

#### Scientific Society Memberships

- 2011-present Selected Member of Tissue Engineering Society (TERMIS)
- 2007-present Member of New York Academy of Sciences
- 1998-2005 Member of Surfaces in Biomaterials Society

1994-2004	Member of American Society for Gravitational and Space Biology
1988-present	Elected Member of Academy of Surgical Research
1986-present	Elected Member of Orthopaedic Research Society
1984-present	Selected Member of Society for Biomaterials (U.S.)
1978-95	Elected Member of Canadian Biomaterials Society

## 5. Service/ Citizenship

### 5.1 Intramural

#### 5.1.1 Department

15-present	Head, Department Mentoring Program
13-present	IRB, Scientific Scholarly Reviewer
12-present	Chair, Orthopaedic Surgery P&T committee
09-11	Sports Fellowship Candidate Interviews
06-11	Sports Fellowship and Residency, Accreditation Review Interviews
05-12	Member, Orthopaedic Surgery Department P & T Committee
03-12	Orthopaedic Surgery Department Scientific Advisory Committee
95- 99	Surgery, Peer Review Committee
91- 93	Surgery, Budget Committee
90- present	Orthopaedics, Orthopedic Resident Applicant Interview& Review Group

#### 5.1.2 College

11- 15	Dean's Academic Advisory Committee
10- 11	Chair Medical Student Research Committee
10- present	Arizona Arthritis Center Scientific Advisory Board
08- present	Medical Student Research Committee
08	UAC, Surgical Faculty Search Committee, Reviewer for Faculty Evaluations
06-07	Search Committee for Arthritis Center Head & Rheumatology Department Chair
06	Arthritis Data Blitz
06	Mini-Med School Lecture on Cartilage Resurfacing
06	Presentation to Faculty and Staff of Phoenix Branch of Medical School
06	Orthopaedic Research at the University of Arizona
06	Search committee member(Arthritis Center) - Vice Dean, Phoenix Medical School
96	Medical Biochemistry Course Review Subcommittee
94	University Animal Care, College of Medicine,
92- 94	UAC, Surgical Staff Search Committee, Reviewer for Faculty Evaluations

#### 5.1.3 University

17 – present	Chair, University Biology Research Program Governing Board
16 – present	Member, University Biology Research Program Governing Board
15 - present	Faculty Advisor, Wildcat Archery Club
11 – present	Chair, Biomedical Engineering Graduate Interdisciplinary Program
13	Served on BME Department Search Committee for BME Department Head
12	Served on Arizona Arthritis Center (AAC) Search Committee for AAC Director
11	UAC, Faculty Search Committee – Search for DVM Assistant Facilities Director
09-present	BME GIDP Executive Committee
09-present	BME Recruiting and Admissions Committee
06	Served on AME Search Committee for Bio/Mems Faculty

- 06 Participated in Physiological Sciences Site Visit and Promotional Film as a part of GIDP
- 05-06 Consulted on Search for Associate Dean for Honors College
- 01-present Arizona Arthritis Center Board (Representing Orthopaedic Surgery)
- 97-00 Biomedical Engineering IDP, Recruiting and Admissions Subcommittee
- 94-97 Committee on Medical and Biological Engineering& Curriculum committee
- 94-present Graduate College Representative
- 94 Organizer: Musculoskeletal Biomechanics and Robotics Symposium, Developed as Part of University wide BioMedical Engineering Interdisciplinary Program Symposia
- 92-96 Member, Institutional Animal Care and Use Committee

## 5.2 Extramural

### 5.2.1 Service to Profession

#### National Organizations:

- 11 – present Member, Musculoskeletal Transplant Foundation, Medical Advisory Board
- 97-99 Chair & Organizer, Biomaterials Session, Composites: Design for Performance, Lake Louise, Alberta, Canada
- 95 Chair, Bone Biomechanics Session, Orthopaedic Res. Soc., Orlando, FL
- 94 Organizer and Session Chair: Orthopaedic Biomaterials Session for Biomedical Engineering Society Meeting, Tempe, AZ
- 93 Chair, Bone Remodeling Session, Soc. for Biomaterials, Birmingham, AL
- 91 Chair, Tissue Ingrowth into Porous Surfaces, Soc. for Biomat., Phoenix, AZ
- 90 Chair, Tissue Culture and Computer Models, Soc. for Biomat., Charleston, SC
- 87 Chair, Bone Remodeling, Soc. for Biomaterials, New York, NY
- 86 Chair, Fracture Fixation, Society for Biomaterials, Minneapolis, MN
- 92 & 93 Long Range Planning Committee of Society Council, Soc. for Biomaterials

#### Reviewer for Articles:

- 99 to present Advisory Editor, Editorial Board: Clinical Orthopaedics and Related Research
- 93 to present Editorial Board: Journal of Investigative Surgery
- 93 to present Reviewer: Clinical Orthopaedics and Related Research
- 99 to present Editorial Board: Journal of Biomedical Materials Research- Part B
- 2017 Reviewer: Journal of Mechanical Behavior of Biomedical Materials
- 2017 Reviewer: PLOS ONE
- 2014- 2015 Reviewer: Tissue Engineering
- 2014 Reviewer: ASME Journal of Medical Devices
- 92 to 99 Reviewer: Journal of Applied Biomaterials
- 93 Reviewer: American Journal of Physiology

#### Reviewer for Grants:

- 05 – present Reviewer, Musculoskeletal Transplant Foundation, Junior Investigator Grants
- 01 to present Reviewer: WAESO student support grants, National Science Foundation
- 99 to present Reviewer: CAREER & Renewal Grants National Science Foundation
- 92 to present Reviewer: Veterans Administration Competitive Renewal Research Grants
- 91 to present Reviewer: WAESO/NSF Undergraduate Review Committee
- 94 Reviewer: Bioengineering Alliance Collaborative Research Proposals Bioengineering Alliance, Clemson, South Carolina

- 92 & 93 Reviewer: S.B.I.R. grants, National Science Foundation  
 92 Reviewer: Graduate Research Training Program Grant,  
 National Science Foundation  
 92 Reviewer: Competitive Renewal Research Grants,  
 Orthopaedic Education Research Foundation  
 91 Reviewer: Competitive Renewal Grants, National Science Foundation

### 5.3.1 Service to community

- 18 Living Healthy, Served on Panel to answer questions about Arthritis  
 16 Arthritis Center Friends, Served on Panel to answer questions about Arthritis  
 16 Living Healthy, Progress in Cartilage Regeneration  
 15 Living Healthy, Total Surface Cartilage Regeneration  
 14 Cartilage Injuries and Advances in Tissue Regeneration, AAC Presentation  
 13 Advances in Cartilage Tissue Regeneration, Living Healthy  
 12 Advances in Cartilage Tissue Engineering, Living Healthy  
 11 Some Recent Advances in Cartilage Tissue Engineering, Tucson Rotary  
 10 Tucson Lunch Bunch - Tissue engineering can build better joints  
 10 Living Healthy, presentation on Building Better Joints  
 09 SVMA, Veterinary Association – Cartilage Tissue Engineering & stem cells  
 09 Catalina Foothills High School Medical Club Presentation on  
 Cartilage Regeneration  
 09 Living Healthy, presentation on What's new in Cartilage Engineering  
 08 Canyon Ranch, Presentation on Cartilage Tissue Regeneration  
 08 Arthritis Center Friends, Served as expert to answer questions about Arthritis  
 07 Arthritis Center Friends, Served as expert to answer questions about Arthritis  
 06 Arthritis Center Friends, Served as expert to answer questions about Arthritis  
 06 Friends Tea, Presented poster with answer questions about Arthritis  
 06 Presentation to ROTARY Club  
 06 Featured in SABHA Home Builder Magazine  
 06 Presentation and Tour to Head of Arthritis Foundation  
 06 Arizona Daily Star article on scaffold and stem cell work  
 04 Arthritis Center Friends, Served as expert to answer questions about Arthritis  
 03 Arthritis Center Friends, Served as expert to answer questions about Arthritis  
 02 Arthritis Center Friends, Presentation on advances in Arthritis treatment  
 01 Arthritis Center Friends, Presentation on advances in Tissue Engineering  
 00 Arthritis Center Lunch, Presentation on telemetry and *in vivo* sensors  
 99 Arthritis Foundation, Western Regional Juvenile Arthritis,  
 Parent and Child Information Conference,  
 Presentation on Joint Replacements for Active Young Adults  
 98 Arthritis Center Tea, Presentation on telemetry and *in vivo* sensors  
 98 Arthritis Center Friends, Presentation on telemetry for use in knees & back  
 98 Presentation of Knee and Osteoporosis Research to Arthritis Center Friends  
 97 Daughters on Campus presentation and tour of Orthopedic Research Lab  
 95 Catalina Foothills Foundation and Seven School FFA's  
 Volunteer in Fund raiser for Libraries  
 95 Catalina Foothills High School  
 Guest Speaker: two, 2 hr lectures; Freshman Human Biology  
 95 Catalina Foothills Foundation- Volunteer in Fund raiser for School Grants  
 94 Catalina Foothills High School - provided Biology Classes with  
 dissection experiments and supplies

- 93 Presentation on Arthritis and Total Joint Replacement; local chapter Kiwanis
- 93 Community lectures on Orthopaedic implants for Arthritis patients, Tucson,
- 92 Community lectures on Arthritis exercise and implants, Tucson, AZ
- 95 - 2001 Foster care provider, Receiving home and Shelter care,  
So far we have cared for 18 children, ages 1 day up to 14 years

### 5.2.3 Service to State

- 13 Yuma Catholic High School, Bioengineering and Tissue Regeneration
- 13 Yuma Public High School, Bioengineering and Tissue Regeneration
- 13 Arizona Western College, Cartilage Tissue Engineering
- 13 Yuma Regional Foundation, Arthritis and Cartilage Regeneration
- 13 KBLU talk Radio, Cartilage regeneration, in Yuma
- 11 Recent Advances in Cartilage Tissue Engineering, Green Valley AZ
- 09 SVMA, Southern Arizona Veterinary Association– Cartilage Tissue Engineering
- 06 KUAT/ National Public Radio story on scaffold and sensor systems
- 06 Sun City Daily News story from Arizona Daily Star article on scaffold  
and stem cell work
- 03 Presentation to Green Valley Fitness and Recreation Club on  
Tissue Engineered Cartilage for Joint Repair
- 03 Arizona Daily Star article on award and scaffold development work
- 97-present Public Policy & Advocacy Committee Arthritis Foundation (Arizona Chapter)
- 97-98 Governors Advisory Council, Arthritis and Musculo-Skeletal Diseases
- 92-present Faculty Sponsor: Horizons Unlimited Science Exploration Program  
Young Scholars George Stickney, Kyndra White, Kari Thorson
- 97 Presentations on New Orthopaedic implant developments, Green Valley, AZ
- 96 Presentations on Osteoarthritis and Osteoporosis, Green Valley, AZ
- 94 Presentations on Orthopaedic implants for Arthritis patients, Green Valley, AZ
- 93 Presentation on Arthritis and Total Joint Replacement  
to Phoenix Chapter of Arizona Alumni Association, Chandler, AZ
- 93 Lectures on Orthopaedic implants for Arthritis patients, Green Valley, AZ
- 93 Cable TV, Presentation on Artificial Joints for Health Talk
- 92 KUAT TV, Interviewed on "Arizona Alumni" about NIH funded  
University Biology Research Program and Minority High School Research  
Apprenticeship Program

### 5.2.4 Service to Nation/World

- 15 Using fat to build Cartilage in Knees – Ivanho Publications 7-15-2016
- 12 Arizona daily star; Lecture in Tucson on Cartilage Regeneration
- 12 Cover Picture for New York Stem Cell Summit, Feb 2012  
Market Forecast for 2012 through 2022
- 10 KVOA 4 story on Undergraduate researchers doing cartilage research
- 10 KGUN 9 story on stem cell use for cartilage regeneration
- 06 KUAT/ National Public Radio story on scaffold and sensor systems
- 06 Associated Press picked up Daily Star article on scaffold and stem cell work
- 03 Boston Globe, online article on award and scaffold development work
- 98 Channel 6, News Story for Arizona Illustrated,  
Development of sensors bonded to bone for osteoporosis patients
- 98 Tucson Citizen: Development of Sensors and Radio Telemetry for artificial  
joints and development of sensors bonded to bone for osteoporosis patients
- 98 Channel 4: Development of Sensors and Radio Telemetry for artificial joints

- 97 Appointed to Public Policy and Advocacy Committee of Arizona Arthritis Foundation
- 97 Channel 9: How telemetry based knee systems will help younger patients.
- 96 Channel 9: Healthy Monday report on Artificial Knee Developments
- 95 News Release on Development of Artificial knees with sensors,
- 95 PBS and NBC: Interview on Development of Artificial knees with Sensors, aired on Copper State Chronicles
- 95 Radio Release: Development of Sensors and Radio Transmitters for use in Artificial Joints, aired on National Public Radio
- 94 Channel 6, News story; Evolution of artificial hips, from 1841 to present
- 93 Radio Interview: The process of Artificial Joint Development, Nat Public Radio
- 92 Channels 4, 9 and 13, Media lab tour and news spot on artificial joint development and role of artificial joints in the treatment of arthritis.
- 92 Newspaper articles in Tucson and Green Valley papers on development and role of artificial joints in the treatment of arthritis.
- 92 Channel 4, News spot on "Long term in vivo strain sensors and potential uses of this technology in patients"

**6. Publications** (208 Peer Reviewed works, in Chronological order within each subset; most recent first)  
**Average of ~ 7.7 published works per year since 1990.**

6.1 Book Chapters (3 Scholarly Work- Including prior results and previously unpublished information)

Resorbable Polymer- Ceramic Composites for Orthopedic Scaffold Applications, R Vaidyanathan, B Hecht, A Studley, T Phillips, PD Calvert, B Tellis, A Coleman, **JA Szivek**, ISBN: 9780470291191 DOI:10.1002/9780470291191.ch80 in 28th International Conference on Advanced Ceramics and Composites B: Ceramic Engineering and Science, 25, 4, 529 – 536, March 2008.

Synthetic Materials and Structures Used as Models for Bone, **JA Szivek**, in Mechanical Testing of Bone and the Bone-Implant Interface, 10, 159-171, October 1999.

Strain Gauge Measurements from Bone Surfaces, **JA Szivek** and VM Gharpuray, in Mechanical Testing of Bone and the Bone-Implant Interface, 20, 305-320, October 1999.

6.2 Refereed Journal Articles: 87 Full Length Manuscripts.

Cell Heterogeneity and Regenerative Potential of Adipose-Derived Stromal Populations Extracted Using Two Different Bioprocessing Techniques, RF Conway, KM Okarski, **JA Szivek**, *Cytherapy*, (in review 2017).

*In Vivo* Ultrasound Elasticity Imaging Differentiates Healthy From Diseased Posterior Tibial Tendons, Latt LD, L Gao, MS Taljanovic, **JA Szivek**, J Guerra, S McGlone, JA Klewer, and RS Witte., In preparation for Journal of Orthopaedic Research (in review 2017).

Silicone Casings Can Help Restore Reliable In Vivo Transmitter Function by Increasing Power Transfer, Jaclyn L. Ouellette, Andrea C. Arellano, David S. Margolis, **John A Szivek**, ASME Journal of Medical Devices, in preparation for resubmission, 2016.

Adipose-Derived Human Stem Cells: Comparative Organ Specific Mitochondrial Bioenergy Profiles,

Alice S. Ferng, Katherine M. Marsh, Jamie M. Fleming, David Schipper, Naing Bajaj, Alana M. Connell, Tia Pilikian, Kitsie Johnson, Ray Runyan, Stephen M. Black, **John A. Szivek**, Zain Khalpey, Stem Cell International, *Springer Plus*, Vol 5, p. 2057-, 2016.

Environmental Stress Increases Stem Cell Concentration In Extracted Stromal Cell Batches, Kevin M. Okarski, Hannah J. Curtis, **John A. Szivek**, Linda S. Powers, *Tissue Engineering Part A*, Vol 22, S8-S8, ISSN 1937-3341, 2016

Factors Affecting Adipose Derived Pluripotent Cells during Cartilage Regeneration on Allografts Luna M, Duffy BM, Gonzales DA, **Szivek JA**, *Tissue Engineering – Part A*, in review 2015.

Determination of Joint Loads Using New Sensate Scaffolds for Regenerating Large Cartilage Defects in the Knee, **Szivek JA**, Ruth JT, Heden GJ, Wenger KH, *J Biomed Mater Res–B*, published on line in early view 2015.

Ultrasound Elasticity Imaging for Determining the Mechanical Properties of Human Posterior Tibial Tendon: A Cadaveric Study, Gao L, Yuan JS, Heden GJ, Szivek JA, Taljanovic MS, Latt D, Witte RS, *IEEE Transactions on Biomedical Engineering*, ISSN 0018-9294 Vol 62, 4, p. 1179-1184, 2015.

In Vivo Telemetric Determination of Shear and Axial Loads on a Regenerative Cartilage Scaffold following Ligament Disruption, **Szivek JA**, Heden GJ, Geffre CP, Wenger K, Ruth JT, *J Biomed Mater Res–B*, DOI: 10.1002/jbm.b.33120, Vol 102, 7, 1415-1425, 2014.

Co-Culture of Adipose Derived Stem Cells and Chondrocytes with Surface Modifying Proteins Induces Enhanced Cartilage Tissue Formation, Waters HA, Gonzales DA, **Szivek JA**, Geffre CP, Grana WA, *J Investigative Surgery*, published on line, doi: 10.3109/08941939.2012.728681, 2012, in print 26 (3), p.118-126, Jun 2013

Implantable Sensor Technology: From Research to Clinical Practice, Ledet EH, D’Lima D, Westerhoff P, **Szivek JA**, Wachs RA, Bergmann G, *J American Academy of Orthopaedic Surgeons*, Vol 20, 6, 383-392. June 2012.

TU-A-220-03: Ultrasound Elasticity Imaging of Human Posterior Tibial Tendon, L Gao, G Heden, **J Szivek**, M Taljanovic, L D Latt, and R Witte, *Medical Physics* Vol 38, 6, 3748, doi:10.1118/1.3613104, 2011.

Mechanical loading of adipose derived stromal cells causes cell alignment, DA Gonzales, AS Ferng, GP Geffre, JL Borg, M Miller, **JA Szivek**, *J Biomedical Science and Engineering*, 2011, 4, 355-359, **JBISE** doi:10.4236/jbise.2011.45045 published online May 2011 (<http://www.SciRP.org/journal/jbise/>).

Load bearing at the menisco-femoral joint: an in vitro study in the canine knee, PF Indelli, **JA Szivek**, A Schnepf, WA Grana. *The Duke Orthopaedic Journal*, July 2010-June 2011 1(1): 39-43, 10.5005/jp-journals-10017-1006, 2010.

Load Measurement Accuracy from Sensate Scaffolds with and without a Cartilage Surface, CP Geffre, PR Finkbone, CL Bliss, DS Margolis, **JA Szivek**, *J Investigative Surgery*, 23, 156–162, 2010 ISSN: 0894-1939 print /1521-0553 published online, DOI: 10.3109/08941939.2010.481006

Evaluation of Chitosan-Calcium Phosphate Bone Fillers, CP Geffre, J Ochoa, **JA Szivek**, DS Margolis,



J Investigative Surgery, 23, 134–141, 2010, ISSN: 0894-1939 print /1521-0553 online, DOI: 10.3109/08941930903564100

A Biomimetic Sensate Scaffold Measures Loading in a Knee Joint, MD Montague, CP Geffre, CF Gainer, **JA Szivek**, J of Investigative Medicine. 2009 Jan; 57(1): 225-226.

Novel Biomimetic Polymer Scaffold Design enhances Bone Ingrowth, CP Geffre, **JA Szivek**, JT Ruth, DW DeYoung, B Tellis, DS Margolis, Online Dec 2, DOI: 10.1002/jbm.a.32251 JBMR-A, 2008.

A handheld computer as part of a portable *in vivo* knee joint load monitoring system, **JA Szivek**, V Nandakumar, CP Geffre, CP Townsend, ASME, J Med Devices, Design Innovation Paper, Vol: 2- 3 (Sept), 1-10, 2008.

Phenotypic Characteristics of Bone in Carbonic Anhydrase II-Deficient Mice, DS Margolis, **JA Szivek**, L Lai, and Y H. Lien, Calcified Tissue International, Vol 82-1, 66-76, Jan 2008.

Sensate Scaffolds Coupled to Telemetry can Monitor *In Vivo* Loading from within a Joint over Extended Periods of Time, CP Geffre, CL Bliss, **JA Szivek**, DW DeYoung, JT Ruth, DS Margolis, J Biomed Mater Res–B, Vol 84-1, 263-270, 2008.

Trabecular Scaffolds Created Using Micro CT Guided Fused Deposition Modeling, BC Tellis, **JA Szivek**, CL Bliss, DS Margolis, RK Vaidyanathan, P Calvert, J Materials Science & Engineering–C, Vol 28/1 pp 171-178, 2008.

Comparison of Bone Ingrowth into Scaffolds with Simple and Novel Biomimetic Porous Architectures, CP Geffre, **JA Szivek**, DS Margolis, J Invest Med, 56 (1) 242 Suppl., Jan 2008

Scanning and Characterization of Human Scaffolds for Cartilage Tissue Engineering, P Manson, **JA Szivek**, N Webber, J Invest Med, 56 (1) 327 Suppl., Jan 2008

CPC Coated Strain Gauges can Monitor In Vivo Bone Strain in a Mouse, DS Margolis, CP Geffre, **JA Szivek**, L Lai, and Y H. Lien, J Invest Med, 56 (1) 327 Suppl., Jan 2008

Inducing Cartilage Regeneration with Stem cells for Treatment of Osteoarthritis Patients, AS Ferng, CW Ferguson, **JA Szivek**, The FASEB Journal, Vol 22, 819.1, 2008.

Selective cell proliferation can be controlled with CPC Particle Coatings, **JA Szivek**, AB Schnepf, DS Margolis, SK Williams, WA Grana, J Biome Mater Res–A, 81-A, 939-947, 2007.

Sensate Scaffolds can Reliably Detect Joint Loading, CL Bliss CL, **JA Szivek**, BC Tellis, DS Margolis, AB Schnepf, JT Ruth, J Biomed Mater Res–B, Appl Biomats, 81B, 30-39, 2007.

A Comparison of the Effects of Ablative Radiofrequency Treatment and Mechanical Shaving for Meniscectomy, WA Grana, **JA Szivek**, AB Schnepf, R Ramos, Arthroscopy: The Journal of Arthroscopic and Related Surgery, 22-8 (August), 884-888, 2006.

An Instrumented Scaffold can Monitor Loading in the Knee Joint, **JA Szivek**, CL Bliss, CP Geffre, DS Margolis, DW DeYoung, JT Ruth, AB Schnepf, BC Tellis, RK Vaidyanathan, J Biomed Mater Res - B, 79B, 218-228, 2006.

Functionally improved bone in Calbindin-D28k knockout mice, DS Margolis, D Kim, **JA Szivek**, L Lai, and Y H. Lien, Bone 39, 477-484, 2006.

Optical coherence tomography development and use to identify articular cartilage tissue and cell stratification, J Davis, C Bliss, **JA Szivek**, J Invest Med , 54 (1): S114-S114 198 Suppl. S Jan 2006

In vivo strain gauge attachment to mouse femora, DS Margolis, D Pennington, **JA Szivek**, WA Grana, L Furenlid, D Wilson, LW Lia, YH Lien, J Invest Med , 54 (1): S116-S116, 212 Suppl. S Jan 2006.

Porous polybutylene terephthalate implants allow for bone ingrowth and provide a well-anchored scaffold that can be used to deliver tissue-engineered cartilage, DS Margolis, **JA Szivek**, CL Bliss, C Geffre, DW DeYoung, JT Ruth, AB Schnepf, B Tellis, RK Vaidyanathan, J Invest Med , 54 (1): S116-S116 213 Suppl. S Jan 2006.

*In Vivo* Strain Measurements from Hardware and Lamina during Spine Fusion, **JA Szivek**, RF Roberto, DS Margolis, J Biomed Mater Res-B 75B:243-250, 2005.

TGF- $\beta$ 1-enhanced TCP-coated Sensate Scaffolds can detect bone bonding, **JA Szivek**, D Margolis, BK Garrison, E Nelson, RK Vaidyanathan, DW DeYoung, J Biomed Mater Res-B, Vol: 73B-1, 43-53, 2005.

Distribucion de las cargas en los condilos femorales de la rodilla: estudio biomecanico en perros/  
Load distribution in knee femoral condyles: biomechanical study in dogs, P Indelli, R Vestri, **J Szivek**, A Schnepf, W Grana, Rev. Argent. Artosc, Vol 11, 1, 54-58, 2004

Bilateral Symmetry of Biomechanical Properties in Mouse Femora, DS Margolis, Y H. Lien, L Lai, and **JA Szivek**, Med Engineering & Physics, Vol: 26-4, 349-353 , 2004.

TGF- $\beta$ 1 Accelerates Bone Bonding to a Blended CPC Coating: A Dose Response Study, **JA Szivek**, ER Nelson, SD Hajdu, K Yablonski, DW DeYoung, J Biomed Mater Res-A 68A-3, 537-543, 2004.

Decreased osteoblast activity in carbonic anhydrase II deficient mice causes osteoporotic bone, DS Margolis, D Kim, **JA Szivek**, L Lai, G Kastis, YH Lien, J Invest Med, 52 (1): S80-S80 Jan 2004.

Load bearing at the menisco-femoral joint: an in vitro study in the canine knee, PF Indelli, **JA Szivek**, A Schnepf, WA Grana. (SS-22). *Arthroscopy* 20( S1): e10, 2004.

Evaluation of a new CPC-to-Gauge Bonding Technique with the use of In Vitro Fluid Flow, Mark M. Fernandez, **JA Szivek**, DS Margolis, J Biomed Mater Res - B Vol: 66B, 514-519, 2003.

The Effect of Implant Overlap on the Mechanical Properties of the Femur, T Harris, JT Ruth, **J Szivek**, B Haywood, J Trauma; 54(5):930-935, 2003.

Preparation and Testing of Sensate Scaffolds, M. Dag, **JA Szivek**, DS Margolis, J Invest Med, 52 (1): S51-S51, 248, Feb 2003.

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Anatomic, Mechanical and Bone Dynamics Characterization of the Dog as an Animal Model for Hip Implant Studies, JB Koeneman, RD Poser, AR Villanueva, **JA Szivek**, TM Hansen, Trans of the 7<sup>th</sup> Annual Academy of Surgical Research, Scottsdale AZ, Sept. 1991.

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A Quantitative Study of the Effect of Strain Redistribution on Bone Remodeling, **JA Szivek**, HU Cameron, GC Weatherly, RM Pilliar, Orthopaedic Trans *in* J. Bone Jt. Surgery, Vol. 9, 2, 375-376, 1985.

The Effect of Partially and Fully Porous Coated Hip Stem Design on Biological Fixation and Adaptive Bone Modeling, JD Bobyn, RM Pilliar, AG Binnington, **JA Szivek**, Orthopaedic Transactions *in* J. Bone Jt. Surgery, Vol. 9, 2, 286-287, 1985.

A Study of Bone Remodeling Using Biologically Attached Composite On-Lay Plates, **JA Szivek**, HR Cameron, GC Weatherly, RM Pilliar, Orthopaedic Trans *in* J. Bone Jt. Surgery, Vol. 5, No. 2, 234-235, 1981.

6.4 Review Articles (Peer Reviewed)

Bioceramic Coatings for Artificial Joint Fixation, **JA Szivek**, J of Investigative Radiology, Vol. 27, 7, 553-558, 1992.

6.5 Other Scholarly Contributions

**Patent Related – 11 disclosures completed or in review**

**UA 16-000** pending disclosure to file Provisional Patent

TITLE: Biomimetic Scaffold Design that facilitates cell infiltration

INVENTORS: **John A. Szivek** & Czarina Aguilar

**UA 16-078** disclosure used to file Provisional Patent

TITLE: Cell and Calcium Infiltrated Biomimetic Scaffolds

Accelerate Bone Growth during Long Bone Segment Repair

INVENTORS: **John A. Szivek** & Jordan Smith & David Gonzales

**UA 15-164** disclosure used to file Provisional Patent

TITLE: Selective Process for Enriching Viable Cells

INVENTORS: Kevin Okarski & **John A. Szivek** & Hannah Curtis & Linda Powers

**UA 15-045** disclosure used to file Provisional Patent

TITLE: Osteochondral Allograft Surface Regeneration Technique

INVENTORS: **John A. Szivek** & Breanna Duffy & Marysol Luna

**UA 14-118** disclosure used to file Provisional Patent

TITLE: Accelerating Soft Tissue Healing facilitated by

Surgery Combined with Extracted Cells and Blood Products.

INVENTORS: Jamie Fleming & **John A. Szivek** & Joe Sheppard

**UA 12-014** disclosure used to file Provisional Patent

TITLE: Purification of Stem Cells

INVENTORS: Linda Powers, Walter Ellis, **John A. Szivek**

FILED: August, 2011

**UA 10-043** disclosure used to file Provisional Patent

TITLE: A Method for Attracting and Anchoring Stem Cells to Tissue

INVENTORS: **John A. Szivek**

FILED: October, 2009

**UA 08-079** disclosure used to file Provisional Patent

TITLE: A Better Technique for Storing Adipose Derived Stem Cells for Future Tissue Engineering Applications

INVENTORS: **John A. Szivek**

FILED: March, 2008

**UA07-020** disclosure contracted to Tissue Genesis

TITLE: Calcium Phosphate Surfaces to Support Adipose ...

INVENTORS: **John A. Szivek** & Stuart K. Williams

OBLIGATED: Spring 2007

Tissue Genesis Intended to File Patent and License Technology but missed deadline to complete filing

**UA 05-058** disclosure used to file Provisional Patent

TITLE: Guiding Bone Structural Replication

INVENTORS: **John A. Szivek** & Brandi C. Tellis

FILED: October, 2007

**UA 05-035** disclosure used to file Provisional Patent

TITLE: Sensate Scaffold Systems for In Vivo Load Monitoring

INVENTORS: **John A. Szivek**

FILED: January, 2005

## **Computer Software Development**

2011- 2013 Tissue Load Monitoring Software for Tablet Computer  
- Windows OS & Labview Software

2004- 2006 Tissue Load Monitoring Software for Dell Handheld Computer with Windows Software

### Newsletters

Department of Orthopaedic Surgery Newsletter, NIH Sensate Scaffold Development and Cartilage Regeneration Study: Biomimetic Scaffold Development and Testing, **JA Szivek**, Vol 6-1, 2008

Department of Orthopaedic Surgery Newsletter, Part 3 of Phase 1 NIH Sensate Scaffold Development Grant: Calibration and Placement of Scaffolds with Sensors, **JA Szivek**, Vol 5-1, 2005

Department of Orthopaedic Surgery Newsletter, Part 2 of Phase 1 NIH Sensate Scaffold Development Grant: Model of Loaded Knee to Study Cartilage Surface Pressure, **JA Szivek**, Vol 3-1, 2003

Department of Orthopaedic Surgery Newsletter, Development of Resorbable Scaffolds for Cartilage Carriers, Tendon Anchors and Autograft Substitutes, **JA Szivek**, Vol 2-2, 2002

Department of Orthopaedic Surgery Newsletter, Clinical Results of Implantable Sensor Development are Promising, **JA Szivek**, Vol 2-1, 2002

Department of Orthopaedic Surgery Newsletter, Lab Highlights, , **JA Szivek**, Vol 1-2 2001



Department of Orthopaedic Surgery Newsletter, A Laser Scanning Technique used to Quantify Polyethylene Wear Loss, **JA Szivek**, Vol 1-1, 2001

Newsletter to Physicians: on Congruity Testing to Redesign Artificial Knee's, and A New Screening Technique to Assess Clinical Wear of Tibial Inserts, Clinical Research News for Arizona Physicians; **JA Szivek** and J.B. Benjamin, Vol. 4, # 5 May 1993

Guest Editorial; The Changing Face of Surgical Research: From tissue repair to gene replacement, J. of Investigative Surgery, **JA Szivek** Vol. 8, No. 3, 230-233, 1995

**See Addendum for remainder of Section 6. It includes Abstracts, Research Reports, Conference Proceedings and Other Scholarly Contributions.**

7. **Work in Progress** (In review or in preparation)  
Stem cells for use in growing complete cartilage surfaces for osteoarthritis patients  
Stem cell for use in regenerating cartilage surfaces on allografts

8. **Media (Performances, Shows, Exhibits, Videotapes, News Papers)**

**Ivanho Media – Doctors In Depth Interview**

Stem Cells to Build Cartilage May 2016

**KBLU talk Radio**, Stem Cells for Cartilage Regeneration, in Yuma January 2013

**Cover of New York Stem Cell Summit**, Analysis and Market Forecasts for 2012 – 2022  
– Provided Cover Image for Executive Summary, Feb 2012

**Arizona Daily Star** - Lecture in Tucson on Cartilage Regeneration, June 2012

**Latest Stem Cells News**, [www.stem-cells-news.com](http://www.stem-cells-news.com), Tag Archive for Cartilage,  
Scientist John Szivek uses stem cells to treat Arthritis, September 2010

**Orthopedics this Week** - Biologics,

Fix Knees with Fat, story by Jacqueline Rupp, October 2010

**KVOA TV 4**, Undergraduates Participate in Stem Cell Studies to Regenerate Cartilage  
October, 2010

**KGUN TV 9**, Tucson Arizona

Fat Derived Stem Cell used to Regenerate Cartilage, September 2010

**Latest Stem Cells News**, [www.stem-cells-news.com](http://www.stem-cells-news.com), Tag Archive for 'Cartilage',  
Article by Stem Man, Scientist John Szivek uses stem cells to treat Arthritis, September 2010

**UANow** News Item, Hope for Arthritis Patients in Fat Tissue, September 2010

**Arizona Daily Star**, News paper article

MTF Allograft Resurfacing Grant, September 2009

**Biozona Newsmakers**, Faculty Mentors Go the Extra Mile, [uanews.org/node/23940](http://uanews.org/node/23940)  
La Monica Everett-Haynes, University Communications, February 2009

**UBRP Gazette**, Vol 20 Issue 1,  
News Article, What is a Mentor and Mentoring Award Ceremony, Feb 2009

**Tucson Citizen**, Big stage for UA women biologists, [www.tucsoncitizen.com](http://www.tucsoncitizen.com),  
Tucson, Arizona, March 2008

**KCBD Channel 11**, An Alternative to Joint Replacement in the Future,  
Lubbock, Texas, January 2008

[**Stem Cells**] - Fat for Osteoarthritis Cartilage  
Posted at [www.ssscr.org](http://www.ssscr.org), Jen Christensen, Oct 2007

**KUAT TV 6**, News Story for Arizona Illustrated, aired June 2006  
Development of “Sensate” Scaffolds with Telemetry for Cartilage Tissue Regeneration

Research Matters at the UA College of Medicine,  
“UA Investigators Developing New Technology for Arthritic Joints”, June 2006

**Tucson Citizen**, “UA gets \$3.3M to help boost women in science”,  
La Monica Everett-Haynes, September 2006

Tucson Citizen and Sun City News, Sun City Arizona,  
News paper articles, Sensate Scaffolds, 2006

**Tucson Citizen**, “Campus researchers getting a lot younger”, [www.tucsoncitizen.com](http://www.tucsoncitizen.com),  
La Monica Everett-Haynes, October, 2006

**Southern Arizona Home Builders Magazine**,  
Helping Charities Build a Better Community, October 2006

**Tucson Citizen**, News paper article on Sensate Scaffold systems, Spring 2003

**Green Valley News**, News paper article on Sensate Scaffold systems, Summer 2003

**KUAT TV 6**, News Story for Arizona Illustrated,  
Development of Sensors and Radio Telemetry for artificial joints and  
development of sensors bonded to bone for osteoporosis patients, aired May 4,1998

**Tucson Citizen**, Newspaper story, Development of Sensors and Radio Telemetry for artificial joints  
and development of sensors bonded to bone for osteoporosis patients, April 98

**KVOA TV 4**, TV interview:  
Development of Sensors and Radio Telemetry for artificial joints, April 1998

News Story on Development of Artificial Knees with Sensors and Radio Telemetry, 1997

News Release on Development of Artificial Knees with Sensors, 1995

**PBS and NBC:** Interview on Development of Artificial Knees with Sensors, aired on Copper State Chronicles, 1995

**National Public Radio,** Development of Sensors and Radio Transmitters for use in Artificial Joints, aired 1995

**KUAT TV 6,** News story on the Evolution of artificial hips, **Arizona Illustrated,** aired Jun 27, 1994

**Tucson Lifestyles.** Magazine article in Arthritis Foundation and Arthritis Related Issues Oct. 93

**KGYY, Green Valley,** Radio Interview: Recent Developments in Artificial Joint Replacement, 30 min. interview, aired April 1993

**National Public Radio.** Interview: The process of Artificial Joint Development, taped segment for distribution, April 1993.

**KUAT TV 6,** Cable TV presentation: Artificial Joint Replacements, 2 hr presentation by Arizona Arthritis Center, March 14, 1993 taped and aired as part of AHSC Health Talks

**KUAT TV 6,** interview: Interviewed about The University Biology Research Program and Teacher Research Faculty Sponsors, taped 30 min. **Arizona Alumni,** aired Sept. 1992

**KVOA TV 4,** news interview: Story "Long term in vivo strain sensors and potential uses of this technology in patients", July 1992

**Green Valley News and Sun,** Print Media: Interviewed for story "UA Arthritis Center Develops Innovative Techniques", June 1992

**TV Channels 4, 9, and 13,** Media interview: lab tour and news spot on artificial joint development and role of artificial joints in the treatment of Arthritis, June 1992

**Reflections,** University of Arizona Publication, Brochure on charitable giving, 1993

**Arizona Daily Star,** The effects of Biomedical Research on patient care at UMC, May 28, 1993

"Binding Bone: Will new Bioceramic coatings improve orthopedic implants?" Cited interview by Deborah Erickson **Scientific American,** August, 1991.

## 8. Scholarly Presentations

### 8.1 Lectures (106 lectures; Averaging ~ 4 lectures per year since 1990)

Length    Students    Content

2017	1 hr	110	Guest Lecturer: Bone and Tissue Engineering, <b>BME 295c</b>
	1 hr	16	1 hr 30 Survival Skills and Ethics, <b>SLHS 649</b>
2016	3 hrs/week	31	Co-ordinated and/or taught 27 classes in fall semester <b>AME/BME 466/566</b>
	1 hr	110	Guest Lecturer: Bone and Tissue Engineering, <b>BME 295c</b>
	1 hr	30	Survival Skills and Ethics, <b>SLHS 649</b>
2015	1 hr	110	Guest Lecturer: Bone and Tissue Engineering, <b>BME 295c</b>
	1 hr	30	Survival Skills and Ethics, <b>SLHS 649</b>
2014	0.5 hr	8	Honors Career Path Lab tour and talk, <b>PSIO 295H</b>
	1 hr	99	Guest Lecturer: Bone and Tissue Engineering, <b>BME 295c</b>
	1.25 hr	20	Guest Lecturer: Joint Loading and Tissue Engineering, <b>AME/BME 466/566</b>
	1 hr	30	Survival Skills and Ethics, <b>SLHS 649</b>
2013	1 hr	40	Honors Panel Discussion; Career Path, <b>PSIO 295H</b>
	1.25 hr	20	Guest Lecturer: Joint Loading and Tissue Engineering, <b>AME/BME 466/566</b>
	1 hr	95	Guest Lecturer: Bone and Tissue Engineering, <b>BME 295c</b>
	1 hr	14	Lecturer: Orthopedic Biomaterials Orthopedic Residency Rounds, Basic Sciences Lecture Series
	1 hr	14	Lecturer: Biomechanical Principals in Orthopedics Orthopedic Residency Rounds, Basic Sciences Lecture Series
	1 hr	30	Survival Skills and Ethics, <b>SLHS 649</b>
2012	1.25 hr	20	Guest Lecturer: Joint Loading and Artificial Joints, <b>AME/BME 466/566</b>
	1 hr	80	Guest Lecturer: Bone and Tissue Engineering, <b>BME 295c</b>
	1 hr	14	Lecturer: Orthopedic Biomaterials, Basic Sciences Lecture Series
	1 hr	14	Lecturer: Biomechanical Principals in Orthopedics Orthopedic Residency Rounds, Basic Sciences Lecture Series
2011	1 hr	14	Lecturer: Orthopedic Biomaterials, Basic Sciences Lecture Series
	1 hr	14	Lecturer: Biomechanical Principals in Orthopedics Orthopedic Residency Rounds, Basic Sciences Lecture Series
	1 hr	20	Guest Lecturer: Applied Biomechanics, <b>AME/BME 466/566</b>
	1 hr	44	Seminar Lecturer: Tissue Engineering, <b>BME 696a</b>
2010	1 hr	14	Lecturer: Orthopedic Biomaterials, Orthopedic Residency Rounds Basic Sciences Lecture Series
	1 hr	14	Lecturer: Biomechanical Principals in Orthopedics Orthopedic Residency Rounds, Basic Sciences Lecture Series
	1 hr	20	Guest Lecturer: Applied Biomechanics, <b>AME/BME 466/566</b>
2009	2 hr	14	Lecturer: Biomechanical Principals in Orthopedics Orthopedic Residency Rounds, Basic Sciences Lecture Series
	1 hr	14	Lecturer: Orthopedic Biomaterials, Orthopedic Residency Rounds Basic Sciences Lecture Series
2008	1 hr	20	Seminar: <i>Cartilage Tissue Regeneration</i> UBRP Summer Seminar Series
	1 hr	10	Lecture: <i>Cartilage Tissue Loading, Injury and Repair</i>

			Orthopaedic Sports Medicine Rounds
	1 hr	14	Lecturer: Orthopedic Biomaterials, Orthopedic Residency Rounds
			Basic Sciences Lecture Series
	2 hr	14	Lecturer: Biomechanical Principals in Orthopedics
			Orthopedic Residency Rounds, Basic Sciences Lecture Series
2007	1 hr	14	Lecturer: Orthopedic Biomaterials, Orthopedic Residency Rounds
			Basic Sciences Lecture Series
	2 hr	14	Lecturer: Biomechanical Principals in Orthopedics
2006	16 hrs/sem	5	Faculty Mentor on Design project and lab, AME <b>412/412A</b>
			“Cartilage Replacement Scaffold”
	16 hrs/sem	5	Faculty Mentor on Design project and lab, AME <b>413/413B</b>
			“Cartilage Replacement Scaffold”
			Orthopaedic Sports Medicine Rounds
	1 hr	30	Lecturer: Medical School Musculoskeletal Block, Activity Induced Bone Remodeling
	1 hr	14	Lecturer: Orthopedic Biomaterials, Orthopedic Residency Rounds
			Basic Sciences Lecture Series
	2 hr	14	Lecturer: Biomechanical Principals in Orthopedics
			Orthopedic Residency Rounds, Basic Sciences Lecture Series
	240 hrs	1	Orthopaedic Biomechanics/Biomaterials Research Elective: Lab instruction and
2005	1.5 hr	20	Guest Lecturer: Current Topics in Biomedical Engineering, <b>BME 495C/595C</b>
			<i>Orthopaedic Implant Development</i>
	1.5 hrs	23	Guest Lecturer: Biomedical Engineering Seminar Series, <b>BME 696A</b>
			<i>Sensate Scaffold Development: Adventures in Tissue Engineering</i>
	1 hr	10	Lecture: <i>Cartilage Tissue Loading, Injury and Repair</i>
			Orthopaedic Sports Medicine Rounds
	1 hr	14	Lecturer: Orthopedic Biomaterials, Orthopedic Residency Rounds
			Basic Sciences Lecture Series
	2 hr	14	Lecturer: Biomechanical Principals in Orthopedics
			Orthopedic Residency Rounds, Basic Sciences Lecture Series
	240 hrs	1	Orthopaedic Biomechanics/Biomaterials Research Elective: Lab instruction and participation in supervised project in the Orthopaedic Research Lab, <b>SURG 815L</b>
2004	1 hr	35	Team Lecturer: Mechanics of Bone & Cartilage, <b>BME 411/511</b>
	1 hr	35	Team Lecturer: Mechanics of Cartilage Resurfacing, <b>BME 411/511</b>
	1 hr	40	Team Lecturer: Orthopaedic Implant Development, <b>BME 495C/595C</b>
	1 hr	20	Guest Seminar: In Vivo Sensor & Telemetry Development, <b>Physiological Sciences</b>
	1 hr	15	Lecture: Orthopedic Biomaterials, Resident Basic Sciences Lecture Series
	1 hr	15	Lecture: Orthopedic Biomechanics, Resident Basic Sciences Lecture Series
	1 hr	15	Lecture: Orthopedic Biomechanics, Resident Basic Sciences Lecture Series
	0.5 hr	50	Lecture: Cartilage Resurfacing, <b>Frontiers in Biomedical Research</b>
2003	1 hr	25	Team Lecturer: Mechanics of Biomaterials & Implant Design, <b>BME 495C/595C</b>
	1 hr	25	Team Lecturer: Mechanics of Bone & Cartilage, <b>BME 411/511</b>
	1 hr	25	Team Lecturer: Mechanics of Cartilage Resurfacing, <b>BME 411/511</b>
	1 hr	15	Lecturer: Orthopedic Biomaterials, Resident Basic Sciences Lecture Series
	1 hr	15	Lecturer: Biomechanical Principals in Orthopedics

	1 hr	10	Sports Medicine Rounds, Knee Loading, Damage and Repair
2002	1.5 hr	25	Guest Lecturer: Mechanics of Biomaterials, <b>AME 466/566</b>
	1 hr	20	Lecturer: Orthopedic Biomaterials, Resident Basic Sciences Lecture Series
	1 hr	20	Lecturer: Biomechanical Principals, Resident Basic Sciences Lecture Series
2001	1.5 hrs		Team Lecturer: Biomedical Engineering, <b>BME 416/516</b>
	1 hr	20	Lecturer: Orthopedic Biomaterials, Orthopedic Residency Rounds Basic Sciences Lecture Series
	1 hr	20	Lecturer: Biomechanical Principals in Orthopedics Orthopedic Residency Rounds, Basic Sciences Lecture Series
2000	1 hr	20	Lecturer: Orthopedic Biomaterials, Orthopedic Residency Rounds Basic Sciences Lecture Series
	1 hr	20	Lecturer: Biomechanical Principals in Orthopedics Orthopedic Residency Rounds, Basic Sciences Lecture Series
1999	1.5 hr	20	Guest Lecturer: Introduction to Engineering Professions <b>ENG 196</b>
	1 hr	20	Lecturer: Orthopedic Biomaterials, Orthopedic Residency Rounds Basic Sciences Lecture Series
	1 hr	20	Lecturer: Biomechanical Principals in Orthopedics Orthopedic Residency Rounds, Basic Sciences Lecture Series
1998	1 hr	20	Lecturer: Orthopedic Biomaterials, Orthopedic Residency Rounds Basic Sciences Lecture Series
	1 hr	20	Lecturer: Biomechanical Principals in Orthopedics Orthopedic Residency Rounds, Basic Sciences Lecture Series
1997	1 hr	14	Lecturer: Orthopedic Biomaterials, Orthopedic Residency Rounds Basic Sciences Lecture Series
	1 hr	14	Lecturer: Biomechanical Principals in Orthopedics Orthopedic Residency Rounds, Basic Sciences Lecture Series
	1.5 hr	30	Guest Lecturer: Medical Physics, <b>AR&amp;S 195</b>
	1 hr	25	Guest Lecturer: Applied Biomechanics, <b>AME 466/566</b>
	1 hr	25	Guest Lecturer: Mechanics of Biomaterials, <b>AME 466/566</b>
	1.5 hr	20	Guest Lecturer: Biomaterials in Orthopedics, <b>MSE 461/561</b>
1996	1 hr	16	Lecturer: Orthopedic Biomaterials, Orthopedic Residency Rounds Basic Sciences Lecture Series
	1 hr	16	Lecturer: Biomechanical Principals in Orthopedics Orthopedic Residency Rounds, Basic Sciences Lecture Series
	1.5 hr	30	Guest Lecturer: Medical Physics <b>PHY 402/502</b>
	4 hr	20	Guest Lecturers: Pima Community College, Biological Research, <b>BIO 197</b>
1995	1 hr	10	Lecturer: Orthopedic Biomaterials, Orthopedic Residency Rounds Basic Sciences Lecture Series
	1 hr	10	Lecturer: Biomechanical Principals in Orthopedics Orthopedic Residency Rounds, Basic Sciences Lecture Series
	1.5 hr	16	Guest Lecturer: Physics of Biomaterials <b>PHY 402/502</b>
	1 hr	25	Guest Lecturer: Applied Biomechanics, <b>AME 466/566</b>

	1 hr	25	Guest Lecturer: Mechanics of Biomaterials, <b>AME 466/566</b>
1994	1.5 hr	30	Guest Lecturer: Medical Physics <b>PHY 402/502</b>
	1.5 hr	20	Guest Lecturer: Biomaterials in Orthopedics, <b>MSE 461/561</b>
	1 hr	10	Lecturer: Orthopedic Biomaterials, Orthopedic Residency Rounds Basic Sciences Lecture Series
	1 hr	10	Lecturer: Biomechanical Principals in Orthopedics Orthopedic Residency Rounds, Basic Sciences Lecture Series
	1 hr	10	Lecturer: Experimental Model Development, Orthopedic Residency Rounds, Basic Sciences Lecture Series
1993	1.5 hr	30	Guest Lecturer: Medical Physics <b>PHY 402/502</b>
	1.5 hr	20	Guest Lecturer: Applied Biomechanics, <b>AME 466/566</b>
	1.5 hr	20	Guest Lecturer: Biomechanics Research, <b>AME 466/566</b>
	2 hr	8	Guest Lecturer: Diagnostic Radiology Residence, Artificial Hip Development
	2 hr	8	Guest Lecturer: Diagnostic Radiology Residence, Artificial Knee Development
	1 hr	12	Lecturer: Orthopedic Biomaterials, Orthopedic Residency Rounds Basic Sciences Lecture Series
	1 hr	12	Lecturer: Biomechanical Principals in Orthopedics Orthopedic Residency Rounds, Basic Sciences Lecture Series
	1 hr	12	Lecturer: Experimental Model Development, Orthopedic Residency Rounds, Basic Sciences Lecture Series
	1 hr	12	Lecturer: Analytical Model Development, Orthopedic Residency Rounds, Basic Sciences Lecture Series

- 8.2 Colloquia, Seminars, Symposia (**Invited Speaker**)  
Recent advances in Cartilage Regeneration  
Invited Speaker, Living Healthy, College of Medicine, Tucson AZ  
April 4, 2016
- Biomimetic 3D Printed Scaffolds with Adult MSC's Accelerate Bone Ingrowth for Long Segment Repair, Cell Therapy & Regenerative Medicine Symposium, Tucson AZ Jan 2016
- A Biometric Scaffold Design Supports Long Segment Repair- Preliminary Results  
Rheumatology Grand Rounds, Tucson AZ, October 2015
- A Biomimetic Inverse Trabecular-Patterned Scaffold to Accelerate Bone Ingrowth for Long Segment Repair, Orthopaedic Research Society - Sun Valley Workshop, Sun Valley ID, August 2015
- Update on Cartilage TE and Osteochondral Allografts, Rheumatology Grand Rounds  
Tucson AZ, October 2014
- ORL Research Updates, Orthopaedic Surgery Alumni Event  
Tucson AZ, October 2014
- Cartilage Tissue Engineering on Osteochondral Allografts  
Invited lecture, Samuel Lunenfeld Research Institute of Mount Sinai Hospital and the University of Toronto, Toronto, Ontario, Canada,  
May 30, 2013
- An Update on Cartilage Tissue Engineering  
Rheumatology Grand Rounds  
December 13, 2013
- Preliminary Developments in Cartilage Regeneration Strategies for Osteoarthritis Patients  
Arizona Statewide Rheumatology Conference  
June 2, 2012
- Cartilage Tissue Engineering on Osteochondral Allografts, Rheumatology Grand Rounds  
April 6, 2012
- Cartilage Tissue Engineering On Osteochondral Allografts: A Pilot Study  
Invited lecture, Samuel Lunenfeld Research Institute of Mount Sinai Hospital and the University of Toronto, Toronto, Ontario, Canada,  
April 24, 2012
- Adipose Derived Stem Cells can Regenerate Cartilage Tissue  
BIO5 Stem Cell Research Symposium  
December 1, 2011
- An Update on Cartilage Tissue Engineering studies in the ORL  
Rheumatology Grand Rounds  
November 19, 2010



Advances in Cartilage Regeneration  
Arizona Statewide Rheumatology Conference  
June 1, 2010

Frontiers in Medical Research Seminars,  
CBIO, CBA & MCB 496J/596J, MED 896J, CBIO 896J  
December 8, 2009

What's New in Cartilage Tissue Engineering?  
Invited Speaker, Living Healthy, College of Medicine, Tucson AZ  
November 20, 2008

Advances in Cartilage Tissue Regeneration,  
Invited Speaker, Thriving with Arthritis, Canyon Ranch, Tucson AZ  
October 16, 2008

Cartilage Tissue Regeneration: Scaffolds + Stem Cells - Tissue  
Invited lecture, Samuel Lunenfeld Research Institute of Mount Sinai Hospital and the University of  
Toronto, Toronto, Ontario, Canada, Sept 30, 2008

Advances in Cartilage Tissue Regeneration,  
Invited Speaker, Living Healthy with Arthritis, Arizona Arthritis Center, University of Arizona,  
Tucson AZ May 2008

A "Sensate" Scaffold System to Support Tissue Engineered Cartilage,  
Invited Speaker, Aerospace Mechanical Engineering Department, University of Arizona,  
March 2007

A "Sensate" Scaffold System to Support Tissue Engineered Cartilage,  
Invited to present Grand Rounds, U of Massachusetts, Worcester, Massachusetts, March 2007

*In Vivo* Measurements from Sensate Scaffolds with Tissue Engineered Surfaces,  
Invited lecture, Department of Biomaterials, Faculty of Dentistry, University of Toronto, Toronto  
Canada, Sept, 2006

In Vivo Strain Gauge Attachment to Mouse Femora (with David Margolis) BioSouthwest Expo,  
Doubletree Inn, Tucson, AZ, April 2006

A "Sensate" Scaffold for Cartilage Repair can Measure Joint Loads (with Cody Bliss) BioSouthwest  
Expo, Doubletree Inn, Tucson, AZ, April 2006

Trabecular Scaffolds Created Using Micro CT Guided Fused Deposition Modeling, (with Brandi  
Tellis) BioSouthwest Expo, Doubletree Inn, Tucson, AZ, April 2006

A Portable Load Monitoring System For Knee Joint Pressure Measurement, (with Vivek Nandakumar)  
BioSouthwest Expo, Doubletree Inn, Tucson, AZ, April 2006

Cartilage Tissue Engineering, presented in "The Promise of Stem Cells: Tissue Engineering and  
Regenerative Medicine. Invited Lecture, University of Arizona, Tucson AZ April, 2006  
Bone and Cartilage Physiology, Rheumatology Grand Rounds, University of Arizona,

Tucson AZ, January 2005

Preliminary Results of the Development of Sensate Scaffolds with Tissue Engineered Surfaces, Invited lecture, Department of Biomaterials, Faculty of Dentistry, University of Toronto, Toronto Canada, Sept. 4, 2003

Surface Enhancements Accelerate Bone Bonding to CPC's, International Symposium on Bone Biotechnology and Histotechnology, Harrington Arthritis Research Center, Phoenix AZ, March 2001

Development of Sensate Scaffolding Systems, Quigley Sports Medicine Society, Phoenix Desert Palms Hotel, January 2001

Arizona Biotechnology Science Fair, Phoenix Arizona, April 20, 1999

Display of In Vivo Strain Gauge Systems with Telemetry Technology. New Artificial Joint Developments, Human Performance Laboratory Research Seminar, Human Performance Lab, University of Calgary, Calgary, Canada, Sept 1996.

Hydroxyapatite backed strain gauge development for research and clinical applications, Human Performance Laboratory Research Seminar, University of Calgary, Calgary, Canada, May 1996.

Long term in vivo strain measurement, Interdisciplinary seminar for graduate students and faculty, University of Toronto, Toronto, Canada, Aug. 1994

Orthopedic Implant Development: from inert to sensate prosthetics, Motor Controls Colloquium/ Neurobiology of Motor Prostheses, April 1994.

Hydroxyapatite coated strain gauges for long term *in vivo* measurements, International Workshop on Hard Tissue Biology, Sun Valley, Idaho, August 1993.

Tibio-Femoral Contact Stress and Stress Distribution Evaluation of Total Knee Replacements, Second International Knee Symposium, Tucson, Arizona, May 1992.

Bone Strain Changes Near Press Hip Implants, Joint Replacement Symp. Scottsdale, AZ, Nov. 1990.

In Vivo Strain Measurements: The Gathering of Information toward the understanding of Skeletal Adaptation, International Sun Valley Workshop on Hard Tissue Biology, Sun Valley, Idaho, Aug., 1990.

In vivo strain gauging, Interdisciplinary seminar for graduate students and faculty, Purdue University, Indianapolis, Indiana, Spring 1990

Strain Distribution Around Femoral Prostheses, Joint Replacement Symp., Phoenix, AZ, Nov., 1989.

Induction of De Novo Bone Formation in the Femora of Greyhound Dogs: A Histomorphometric Analysis, International Sun Valley Workshop on Hard Tissue Biology, Sun Valley, Idaho, Aug., 1989

8.3 Independent Study, Honors Thesis and Medical School Elective: **72 students**Instructor/Supervisor (**reporting past 17 yrs. only**)

<u>Year</u>	<u># of Students</u>	<u>Semester</u>	<u>Course</u>
2017	1	Spring	PS 900-013
2017	1	Fall	BME 492
2017	1	Fall	MCB 499
2016	1	Fall	PSIO 610
2016	1	Spring	PS 900-013
2015	1	Fall	PS 900-013
2015	1	Spring	PS 900-013
2015	1	Fall	BME 597G-001
2015	1	Fall	BME 492
2015	1	Spring	PSIO 498H
2015	1	Spring	BIOC 498
2014	2	Spring	BME 492
2014	1	Summer	GRAD 492
2014	1	Fall	PSIO 492
2013	1	Fall	BME 492
2013	1	Fall	ABS 492
2013	1	Spring	BME 492
2013	1	Spring	BME 910
2012	1	Fall	BME 492
2012	1	Spring	PSIO 492
2011	1	Spring	PSIO 492
2011	1	Fall	EEB 399H
2011	1	Fall	MCB 492
2011	1	Fall	BME 693
2011	1	Fall	BME 599
2011	1	Fall	BME 597G
2010	1	Fall	BME 597G
2010	1	Fall	MCB 492
2010	1	Fall	CME
2010	2	Summer	ORTHO 800A
2010	1	Spring	MCB 492
2010	1	Spring	BME 597G
2009	1	Fall	MCB 492
2009	1	Fall	BME 597G
2009	1	Summer	ORTHO 800A
2009	2	Spring	MCB 492
2009	1	Spring	BIOC 498H

2008	2	Fall	BOIC 498H
2008	1	Fall	MCB 492
2008	1	Fall	BME 597G
2008	2	Spring	BIOC 499H
2008	1	Spring	BME 599
2008	1	Spring	PSIO 610
2007	1	Fall	BOIC 492
2007	1	Fall	BOIC 499H
2007	1	Fall	ORTHO 800A
2007	1	Spring	BME 920
2007	1	Spring	MCB 492
2007	1	Spring	MCB 499H
2007	2	Spring	PSIO 498H
2006	2	Fall	MCB 392,
2006	1	Fall	PSIO 498H
2006	1	Summer	Med Student Research Rotation, Chicago Med School
2006	1	Spring	PSIO 498H
2005	1	Spring	BIOC 499H
	1	Spring	MCB 392
2004	1	Spring	MCB 492
2003	1	Spring	MSE 499
2002	1	Fall	MCB 499H
	1	Spring	MCB 499
	1	Spring	MCB 498H
	1	Spring	MCB 399H
2001	1	Fall	MCB 498H
	1	Fall	PSIO 498H
	1	Fall	MCB 299H
	1	Spring	BIOC 499
	1	Spring	MCB 498H
2000	1	Fall	MCB 399H

**9. Grants, Contracts and Foundation Support since 1990 (TOTAL all categories = \$ 5,282,496.00)**

**9.1 Federal, State and University Grants (all peer reviewed) [Total \$ 3,405,277.00]**

<b>Overview</b>	<b><u>Total of 217 grants funded to date</u></b>	
	- <b>16 Federal research grants (NSF, NIH or NASA; including supplements)</b>	
	- <b>197 Federal student support grants as NSF subcontracts</b>	
	- <b>3 University seed grants</b>	
2017	NSF/WAESO <b>Total of 8 WAESO student support grants</b> awarded to study various aspects of tissue engineering cartilage, bone and in vivo load measurement	<b>PI</b>
2017	NSF/WAESO <b>WAESO Research Presentation Travel (RPT) grant</b> awarded to support travel to National Roles Conference, Washington DC.	<b>PI</b>
2016	NSF/WAESO <b>Total of 9 WAESO student support grants</b> awarded to study various aspects of tissue engineering cartilage, bone and in vivo load measurement	<b>PI</b>
2016	NSF/WAESO <b>WAESO Research Presentation Travel (RPT) grant</b> awarded to support travel to National Roles Conference, Washington DC.	<b>PI</b>
15 to 18	NIH- NIAMS 1R21AR065732-01A1 Ultrasound Elasticity Imaging for Gauging Severity of Posterior Tibial Tendon Disorder, Co-PI's Russ Witte and Dan Latt	<b>Co-investigator</b>
10 to 15	NSF/WAESO <b>Total of 63 WAESO student support grants</b> awarded to study various aspects of tissue engineering cartilage, bone and in vivo load measurement	<b>PI</b>
12 to 14	NSF/ MGE@MSA-AGEP Postdoc & Bridge Doctoral Support 1 BME GIDP student supported with award to work on PhD Maria Teresa Velez – PI	<b>Co-Investigator</b>
11 to 13	NIH- NIAMS: National Institutes of Health New Hip Fracture Risk Prediction Tool Based on Common Predictors and Hip Geometry Zhao Chen - PI	<b>Co-Investigator</b>
09 to 13	NSF:(National Science Foundation) SENSORS: In Vivo Joint Regeneration Monitoring System to be Able to Establish Rehabilitation Approaches during Healing	<b>PI</b>
06 to 07	BIO/5 Seed Grant Program	<b>Co-PI</b>

## The Application of Stem Cells to Joint Reconstruction

04 to 08	NSF: SENSORS: An Implantable Joint-Load Sensor, Transmitter and a Portable Reader REU Supplement also awarded in 2004	<b>PI</b>
03 to 09	NSF/WAESO <b>Total of 69 WAESO student support grants</b> awarded to study various aspects of scaffold development and in vivo load measurement and various aspects of tissue engineering cartilage and cell loading and various aspects of tissue engineering cartilage and in vivo load measurement	<b>PI</b>
02 to 07	NIH- NIBIB: National Institutes of Health, National Institute of Biomedical Imaging and Bioengineering Sensate Scaffolds for Orthopaedic Tissue Repair RSUM Supplement awarded 2003-04 RSUM Supplement awarded 2004-05 RSUM Supplement awarded 2005-06	<b>PI</b> <b>PI</b> <b>PI</b> <b>PI</b>
00 to 01	NASA Development of a System for Quantifying in Vivo Bone Strain in Normal and Altered Gravity, Grant - NCC 2 5375 tech Officer J Schonfeld	<b>PI</b>
98 to 02	NSF: Development and Use of a Telemetrized CPC Coated Strain Gauge System for Advancing Fundamental Knowledge of Bone Strain in Animals and Humans REU Supplement 1998 REU Supplement 1999 REU Supplement 2000	<b>PI</b> <b>PI</b> <b>PI</b> <b>PI</b>
96-02	NSF/WAESO <b>Total of 36 WAESO student support grants</b> awarded to study various aspects of wear and artificial joint design and of various aspects of CPC coated strain gauges and cell culture and cell loading studies	<b>PI</b>
92 to 96	NSF: Bone Bonding to HA Coated Strain Gauges: Development of a faster bonding coating	<b>PI</b>
95	UROP:(University Research Opportunities Program) Analysis of the effect of HA on Bone, VIII	<b>Mentor/Co-PI</b>
93	College of Medicine/ NIH Biomedical Research Support Grant: HA coated strain gauge bonding to rodent femora with additional support	<b>PI</b>
93	NASA (National Aeronautics & Space Administration): Directors Discretionary Fund for Space Research HA coated strain gauge bonding to rodent femora and in vivo bone strain measurement	<b>PI</b>
91-95	NSF/CIMD: Histomorphometry near strain gauges,	<b>PI</b>

Analysis of Bone Strain & Histomorphometry Near Strain Gauges  
 Biomechanics of allografts and Bone Bonding to HA Backed Strain gauges  
**Total of 11** student support grants

90 to 91	NSF (National Science Foundation): Development of a Strain Gauge Bonding Process Using an HA Coating:	<b>PI</b>
9.2	<b>Industry Support [Total \$ 356,988.00]</b>	
14 to 15	Tissue Genesis; <b>UA07-020</b> disclosure funding Calcium Phosphate Surfaces to Support Adipose Tissue Derived Cell Proliferation and Differentiation	<b>Co-Inventor</b>
12 to 2013	Regencor: Repair & remodeling augmentation of fracture healing using vibration	<b>Co-PI</b>
08 to 09	Tissue Genesis; <b>UA07-020</b> disclosure funding Calcium Phosphate Surfaces to Support Adipose Tissue Derived Cell Proliferation and Differentiation	<b>Co-Inventor</b>
05 to 2006	Genis: Evaluation of a Novel Bone filler with Osteoinductive Characteristics	<b>PI</b>
02 to 2003	Arthrocare: A Comparison of the Effects of Ablative Therapy with Shaving on Meniscal Tears	<b>Co-PI</b>
00 to 2002	Advanced Ceramics Research [NAVY STTR phase II subcontract]	<b>Co-Invest</b>
99 to 2000	Depuy/Acromed/Johnson and Johnson Monitoring Spine Fusion in patients	<b>Co-PI</b>
99 to 2000	Depuy/Johnson and Johnson Evaluation of Linear and Volumetric Wear of Retrieved UHMWPE Inserts using Laser Scanning	<b>Co-PI</b>
99/ on going	Depuy: Wear Particle Analysis	<b>PI</b>
98 to 99	Johnson and Johnson Implant Stiffness and Strain Redistribution for two Hip Designs	<b>Co-PI</b>
97 to 98	Johnson and Johnson Implant Stiffness and Strain Redistribution for two Hip Designs	<b>Co-PI</b>
96 to 97	Zimmer The Effect of Implant Stiffness on Strain Redistribution at the Implant Distal Tip	<b>Co-PI</b>
94 to 99	Depuy: Measurement of Clinically Imposed Loading on a Tibial Tray in Conjunction with the Development of Sensate Artificial Knees	<b>PI</b>
93 to 94	Depuy: The Patella-Femoral joint in Artificial Knee Systems	<b>PI</b>

91 to 92	Depuy: A Study of Artificial Knee Contact Areas:	<b>PI</b>
90 to 91	Osteonics: The Effect of Implant Stiffness on Strain Redistribution of Implant Tip:	
90 to 91	Biomet: Biomechanical effect of allograft placement on femoral perforations:	<b>PI</b>
9.3	<b>Private Foundations and Major Individual Support [Total \$ 1,520,231.00]</b> (Foundations have provided peer reviewed funding)	
16 to 17	Estate of Irene Hubbel – ORL support grant	<b>PI</b>
15 to 16	The JW Kieckhefer Foundation – 5 <sup>th</sup> continuation of support for hASC study	<b>PI</b>
15 to 16	The M.T. Morris Foundation – 4 <sup>th</sup> continuation of support for hASC study	<b>PI</b>
14 to 15	The JW Kieckhefer Foundation – 4 <sup>th</sup> continuation of support for hASC study	<b>PI</b>
14 to 15	The M.T. Morris Foundation – 3 <sup>rd</sup> continuation of support for hASC study	<b>PI</b>
13 to 14	The Barry and Janet Lang Fund	<b>PI</b>
13 to 14	The JW Kieckhefer Foundation – support for 3 <sup>rd</sup> stage of hASC study	<b>PI</b>
13 to 14	The M.T. Morris Foundation – support for 2 <sup>nd</sup> stage of hASC study	<b>PI</b>
13 to 14	The Bess Spiva Timmons Foundation: Scholarship funding for Tissue Engineering Student	<b>PI</b>
12 to 13	Grace Berg - Support for Cartilage Research	<b>PI</b>
12 to 13	Caroline Lott Jessen Foundation – support for cartilage research	<b>PI</b>
12 to 13	The JW Kieckhefer Foundation – 2 <sup>nd</sup> support to start hASC study	<b>PI</b>
12 to 13	The M.T. Morris Foundation – 1 <sup>st</sup> support to start hASC study	<b>PI</b>
12 to 13	The Abramski Fund	<b>PI</b>
11 to 12	Caroline Lott Jessen Foundation – support for cartilage research	<b>PI</b>
11 to 12	The JW Kieckhefer Foundation – 1 <sup>st</sup> support for hASC facility conversion	<b>PI</b>
11 to 12	The Bess Spiva Timmons Foundation: Scholarship funding for Tissue Engineering Student	<b>PI</b>
10 to 11	Caroline Lott Jessen Foundation – support for cartilage research	<b>PI</b>
10 to 11	The Bess Spiva Timmons Foundation:	<b>PI</b>



Scholarship funding for Tissue Engineering Student

09 to 10	The Bess Spiva Timmons Foundation: Scholarship funding for Tissue Engineering Student	<b>PI</b>
09 to 10	MTF (Musculoskeletal Transplant Foundation) Cartilage Tissue Engineered to Resurface Osteochondral Allografts	<b>PI</b>
00 to 01	The Bess Spiva Timmons Foundation: Testing Implantable Bioactive Polymer-based Bone Grafts Manufactured using Computer-Aided Molding Tools	<b>PI</b>
99 to 00	The Bess Spiva Timmons Foundation: Developing Implantable Bone Scaffolding Systems with Sensors	<b>PI</b>
98 to 00	Scoliosis Research Society: Monitoring Spinal Fusion in Scoliosis Patients; A biomechanical and <i>in vivo</i> study	<b>PI</b>
98 to 99	The Bess Spiva Timmons Foundation: A Comparison of the Extent of Polyethylene Wear of Standard and Hylamer Inserts	<b>PI</b>
97 to 2000	Whitaker Foundation: Special Opportunity Award Biomedical Engineering Program in Imaging, Modeling and Evaluation of Medical Implants: Co-operative Academic - Industrial Program	<b>faculty co-invest</b>
97	Alberta Heritage Foundation; Visiting Scientist Grant Quantification of Influence of Tibial Tubercle Realignment on patellar tracking and joint forces	<b>Co-PI</b>
97 to 98	The Bess Spiva Timmons Foundation: Comparison of the Extent of Polyethylene Wear to Wear Debris Derived from Patient Fluids	<b>PI</b>
96 to 97	The Bess Spiva Timmons Foundation: A Second Generation Radio Monitored Artificial Knee	<b>PI</b>
95 to 96	The Bess Spiva Timmons Foundation: Development of an Artificial Knee with Sensors, which can Monitor Patient Activity by Radio	<b>PI</b>
95	Orthopaedic Education and Research Foundation: Resident Res. Grant; Characterization of UHMPE Debris	<b>Mentor/Co-PI</b>
94 to 95	Gordon Research Allergy Grant/ Arizona Arthritis Center Morphologic Characterization of Inflammation causing UHMPE Wear Debris in Synovial Fluids in Patients with Total Knee Replacements	<b>Co-PI</b>
94 to 95	The Bess Spiva Timmons Foundation: A Computer Simulation of Loading of Plastic Inserts in Artificial Knees	<b>PI</b>

- |          |   |              |
|----------|---|--------------|
| 94       | Hewlett Packard Foundation Grants:<br>Grant for Communications hardware for Workstation                 | <b>PI</b>    |
| 93 to 94 | The Bess Spiva Timmons Foundation:<br>A Contact Pressure Analysis of the Natural Patella Femoral Joint, | <b>PI</b>    |
| 93       | Hewlett Packard Foundation Grants:<br>Equipment Grant for Color Graphics Workstation for FEM modeling   | <b>PI</b>    |
| 92       | Orthopaedic Education and Research Foundation:<br>Laboratory Progress Grant                             | <b>Co-PI</b> |
| 91       | Hewlett Packard Foundation Grants:<br>Equipment Grant for Faxitron, High resolution Xray unit           | <b>PI</b>    |

# Addendum

Includes:

Research Reports to Companies	<b>Section</b>	<b>6.6</b>
Presentations at Conferences	<b>Section</b>	<b>6.7</b>

## 6.6 Research Reports

Genis Corporation final report on "Evaluation of a Novel Bone Repair Material with Osteoinductive Characteristics", August 2006.

Bess Spiva Foundation final report on "Testing Implantable Bioactive Polymer-based Bone Grafts Manufactured using Computer-Aided Molding Tools" May 2001.

Bess Spiva Foundation final report on "Developing Implantable Bone Scaffolding Systems with Sensors" May 2000.

Depuy: Poly Wear Analysis, March 2000

Bess Spiva Foundation final report on "A Comparison of the Extent of Polyethylene Wear of Standard and Hylamer Inserts" May 1999.

Depuy: Development of a Sensate Artificial Knee: Phase 3, June 1999

Bess Spiva Foundation final report on " Comparison of the Extent of Polyethylene Wear to Wear Debris Derived from Patient Fluids " May 1998.

Johnson and Johnson: Implant Stiffness and Strain Redistribution for two Hip Designs, July 1998.

Zimmer: The Effect of Implant Stiffness on Strain Redistribution at the Implant Distal Tip, July 1997.

Depuy: Measurement of Clinically Imposed Loading on a Tibial Tray in Conjunction with the Development of Sensate Artificial Knees, May 1997.

Bess Spiva Foundation final report on "A Second Generation Radio Monitored Artificial Knee" May 1997.

Bess Spiva Foundation final report on "Development of an Artificial Knee with Sensors which can Monitor Patient Activity by Radio" May 1996.

Bess Spiva Foundation final report on "A Computer Simulation of Loading of Plastic Inserts in Artificial Knees" May 1995.

Bess Spiva Foundation final report on "A Contact Pressure Analysis of the Natural Patella Femoral Joint" April 1994.

Depuy Report on "The evaluation of the contact stresses of commercial knee designs: Phase 2" December 1993.

Osteonics report on "An evaluation of Strain Distribution in the Canine Femur after implantation with an hydroxyapatite coated hip", October 1993.

### 5.3 Presentations at Conferences (with Peer Reviewed Abstracts only)

Building a Bridge for Better Bones: Using a 3D-Printed Scaffold to Bridge Bone in Critical Sized Defects, Andrew M Wotanowski, David A Gonzales, **John A Szivek**, Rocky Vista University, Parker Colorado, Dec 2016.

Stem Cell Infiltrated Trabecular-Pattered Scaffolds Induce Extensive Bone Growth during Critical Sized Defect Repair, Andrew M Wotanowski, David A Gonzales, Jordan L. Smith, **John A Szivek**, Orthopaedic Research Society - Sun Valley Workshop, Sun Valley ID, August 2016

Stem cell infiltrated biomimetic inverse trabecular-pattered scaffolds accelerate bone growth during long segment repair in a sheep critical sized defect, **Szivek JA**, Wojtanowski AM, Gonzales DA, Smith JL, pp 262, 10<sup>th</sup> World Biomaterials Congress, Montreal PQ, May 2016

Joint shear load determination using sensate scaffolds that support cartilage regeneration in the knee, **Szivek JA**, Heden GJ, Gonzales DA, Ruth JT, pp 200, 10<sup>th</sup> World Biomaterials Congress, Montreal PQ, May 2016

A Biomimetic Inverse Trabecular-Pattered Scaffold to Accelerate Bone Ingrowth for Long Segment Repair, **John A. Szivek**, David A. Gonzales, Michael A Martinez, Andrew J. Sikorsky, Jordan L. Smith, Orthopaedic Research Society - Sun Valley Workshop, Sun Valley ID, August 2015

Impact of in vivo conditions on power transfer to transmitters and methods for reliable function, **Szivek JA**, Ouellete J, Arellano A, Biomedical Engineering Society (BMES) Annual Meeting, Seattle, WA, Sept. 2013

A 'Sensate' Surface Replacement Scaffold Can Monitor Loading During Cartilage Regeneration" **JA Szivek**, Heden GJ, CP Geffre, JT Ruth, TERMIS, Vienna, Austria Sept 2012.

Implantable "Sensate" Medial Condyle Surface Replacement Allows Shear and Axial Load Sensing Orlando FL, **JA Szivek**, GJ Heden, NH Diggins, CP Geffre, JT Ruth, LD Farrow, April 2011.

SENSORS: *In Vivo* Joint Regeneration Monitoring System to be able to Establish Rehabilitation Approaches during Healing, **Szivek JA**, Ruth JT, DeYoung DW, Barton JK, National Science Foundation CMMI Grantee Conference, Atlanta GA, Jan 2011.

Specific Calcium Phosphate Ceramics Facilitate Cell Proliferation and Adhesion on Osteochondral Allograft, **JA Szivek**, AS Ferng, JL Howard, CP Geffre. Trans of Translational Research Meeting of the Soc for Biomats, Seattle WA, April 2010.

A Biomimetic 'Sensate' Uni-condylar Replacement Scaffold for Knee Joint Resurfacing, **Szivek JA**, Geffre CP, Marini MJ, Heden GJ, Sante Cruz PA. pp 732, Trans of Translational Research Meeting of the Soc for Biomats, Seattle WA, April 2010.

An Implantable Biomimetic Joint Specific 'Sensate' Scaffold Measures Loading in Joints, **JA Szivek**, CP Geffre, MD Montague, CF Gainer, HQ Cadena, GS Takenishi, Trans of the Orthopaedic Res Soc, Las Vegas NV, Feb 2009

"Sensate" Cartilage Covered Scaffolds Can Detect Subtle Load Changes In Vivo Following ACL Disruption, **JA Szivek**, CP Geffre, DS Margolis, DW DeYoung, JT Ruth, DT Harris, Trans of Translational Research Meeting of the Soc for Biomats, Atlanta GA, Sept 2008.

A Cartilage Covered "Sensate" Scaffold Can be Used to Measure Knee Load Changes In Vivo Following ACL Disruption, **Szivek JA**, Geffre CP, Margolis DS, DeYoung DW, Ruth JT, Harris DT, Trans of Combined Orthopaedic Res Soc, accepted for presentation, Honolulu HI, October 2007.

Purified Chitosan Bone Fillers Increase Bone Formation Rates in Bone Defects, **Szivek JA**, Ochoa J, Geffre CP, Margolis DS, DeYoung DW, Ruth JT, Trans Soc for Biomaterials, Chicago IL, April 2007.

Stem Cells Grown in Dynamic Culture on Micro patterned Surfaces can be used to Engineer Cartilage-like Tissue, **Szivek JA**, Wiley D, Cox L, Harris D, Margolis DS, Grana WA, Trans of the Orthopaedic Res Soc, San Diego CA, Feb 2007.

*In Vivo* Load Monitoring During Gait , **Szivek JA**, Geffre CP, Bliss CL, Margolis DS, Ruth JT, DeYoung DW, Trans of the Orthopaedic Res Soc, San Diego CA , Feb 2007.

A Scaffold with Sensors to Monitor Loading of Cartilage in the Knee Joint **Szivek JA**, DeYoung DW, Grana WA, Ruth JT, Williams SK, Vaidyanathan RK, Arms S, Trans of the International Cartilage Society, San Diego CA, Jan 2006.

An Instrumented Scaffold to Monitor Loading of Cartilage in the Knee Joint, **Szivek JA**, Bliss CL, Ruth JT, Schnepf AB, DeYoung, DW, Vaidyanathan RK, Trans. of Orthop Res Soc, Washington DC, Feb 2005.

TCP and TGF- $\beta$ 1 Accelerate Bone Growth into Porous PBT Scaffolds, **Szivek JA**, Garrison BK, Nelson, ER, Margolis DS, DeYoung DW, Vaidyanathan RK, Trans. of Orthopaedic Research Society, Washington DC Feb 2005.

Tissue Engineering Studies of Cartilage and Bone for Joint Resurfacing, **John A. Szivek**, Mark M. Fernandez, William A. Grana, David S. Margolis, Fernando Blumenkron, Paul D. Calvert, Ranjii Vaidyanathan, James B Hoying, Society for Biomaterials, Reno NV, April 2003.

TGF- $\beta$ 1 affects Bone Bonding to a Blended CPC coating: a Dose Response Study **J.A. Szivek**, N.C. Cordaro, D.W. DeYoung., Orthopaedic Research Society, Dallas TX, February 2002

*In Vivo* Strain Measurements from the Lateral Femur and Anterior Tibia of Rats, **J.A. Szivek**, B. Halloran, B Rabkin, P. L. Anderson, S.L. Persselin, Society for Biomaterials, Kona H.I., May 2000.

Comparison of Hylamer Debris with Volumetric Wear Loss, **J.A. Szivek**, M. Wong, J.B. Benjamin, M. Ballesteros, Society for Biomaterials, Providence R.I., April 1999

Variations In Femoral Strains In A Hip Model With The Addition Of Lateral Muscle Loading; **J.A. Szivek**, P.L. Anderson, J.B. Benjamin, B. Marson, Orthopaedic Research Society, Anaheim, CA, Feb 1999

Calcium Phosphate Ceramic/Polysulfone/Polyimide Interface Characteristics After 4, 6, 9 Months *In Vivo*, **J.A. Szivek**, G.A. Battraw, P.L. Anderson, Surfaces in Biomaterials, Tucson, AZ Sept 1998

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**Other**

- 2016            Mentored minority undergrads accepted to present at **NRMC conference**
- 2015            Mentored minority undergrads accepted to present at **ERN conference on STEM**
- 2014            Mentored minority undergrads accepted to present at **ERN conference on STEM**
- 2013            Mentored minority undergrads accepted to present at **ERN conference on STEM**
- 2012            Mentored minority undergrads accepted to present at **ERN conference on STEM**
- 2011            Mentored minority undergrads accepted to present at **ERN conference on STEM**
- 2010            Mentored minority undergrads accepted to present at **ERN conference on STEM**