

# Grace D. O’Connell, PhD

Assistant Professor of Mechanical Engineering  
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## EDUCATION

|             |   |                  |
|-------------|---|------------------|
| 2000 – 2001 | <b>VIRGINIA POLYTECHNIC INSTITUTE</b><br>Bachelor of Science, Aerospace Engineering   | Blacksburg, VA   |
| 2001 – 2004 | <b>UNIVERSITY OF MARYLAND</b><br>Bachelor of Science, Aerospace Engineering   | College Park, MD |
| 2004 – 2009 | <b>UNIVERSITY OF PENNSYLVANIA</b><br>Doctor of Philosophy, Bioengineering<br><i>National Institutes of Health Predoctoral Fellow</i><br>“Degeneration affects the structural and tissue mechanics of the intervertebral disc”<br>Advisor: Dawn M. Elliott, Ph.D | Philadelphia, PA |

## APPOINTMENTS

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|----------------|---|
| 2002           | <b>Undergraduate Research Scientist</b> , Space Systems Laboratory, University of Maryland (PI: David Akin, PhD)                  |
| 2002           | <b>Undergraduate Research Scientist</b> , Glenn L. Martin Wind Tunnel, University of Maryland (PI: Benjamin Shapiro, PhD)         |
| 2004 –2009     | <b>Graduate Research Scientist</b> , McKay Orthopaedic Research Laboratory, University of Pennsylvania (PI: Dawn M. Elliott, PhD) |
| 2009 – 2011    | <b>Math Tutor</b> , Top Honors; Math tutoring for 6 <sup>th</sup> – 9 <sup>th</sup> graders in New York City                      |
| 2009 – 2013    | <b>Postdoctoral Research Scientist</b> , Cellular Engineering Laboratory, Columbia University (PI: Clark T. Hung, PhD)            |
| 2011 – 2012    | <b>STEM Mentor</b> , New York Academy of Science (NYAS), New York City, NY  |
| 2013 – Present | <b>Faculty Affiliate</b> , University of California, Berkeley Stem Cell Center  |
| 2013 – Present | <b>Assistant Professor</b> , Department of Mechanical Engineering, University of California, Berkeley                             |
| 2014           | <b>Faculty Affiliate</b> , UCSF/Berkeley Graduate Group in Bioengineering   |
| 2014 – Present | <b>Core Faculty</b> , UCSF/Berkeley Graduate Group in Bioengineering  |
| 2015 – Present | <b>Faculty Mentor</b> , Society of Women Engineers (SWE) – UC Berkeley Collegiate Section   |
| 2015 – Present | <b>Faculty Mentor</b> , Black Engineers and Scientists Student Association (BESSA), UC Berkeley                                   |
| 2017 – Present | <b>Adjunct Faculty</b> , Department of Orthopaedic Surgery, University of California, San Francisco                               |
| 2017 – Present | <b>Member, Advisory Review Board Member</b> , Journal of Orthopaedic Surgery – Spine, Wiley Publishing                            |
| 2018 – Present | <b>Member, Editorial Review Board</b> , PLOS ONE  |
| 2018 – Present | CITRIS Principal Investigator   |
| 2018 – 2020    | ORS Spine Section Secretary   |

## PEER-REVIEWED JOURNAL PUBLICATIONS

- Johannessen W, Cloyd JM, **O’Connell GD**, Vresilovic EJ, Elliott DM. Trans-Endplate Nucleotomy Increases Deformation and Creep Response in Axial Loading. *Annals of Biomedical Engineering* 34(4),

687-96, 2006.

2. **O'Connell GD**, Vresilovic EJ, Elliott DM. Comparison of Animals Used in Disc Research to Human Lumbar Disc Geometry. *Spine* 32(3), 328-33, 2007.
3. **O'Connell GD**, Johannessen W, Vresilovic EJ, Elliott, D.M. Human Internal Disc Strains in Axial Compression Measured Non-Invasively Using Magnetic Resonance Imaging. *Spine* 32(25), 2860-68, 2007.
4. **O'Connell GD**, Guerin HL, Elliott DM. Theoretical and Uniaxial Experimental Evaluation of Human Annulus Fibrosus Degeneration, *Journal of Biomechanical Engineering*, 131(11): 111007, 2009. PMID: PMC3424515.
5. **O'Connell GD**, Vresilovic EJ, Elliott DM. Human Intervertebral Disc Internal Strain in Compression: The Effect of Disc Region, Loading Position, and Degeneration, *Journal of Orthopaedic Research*, 29(4): 547-55, 2011. PMID: PMC3428014.
6. **O'Connell GD**, Jacobs NT, Sen S, Vresilovic EJ, Elliott DM. Axial Creep Loading and Unloaded Recovery of the Human Intervertebral Disc and the Effect of Degeneration, *Journal of Mechanical Behavior and Biomedical Materials*, 4(7): 933-42, 2011. PMID: PMC3143379.
7. **O'Connell GD**, Malhotra NR, Vresilovic EJ, Elliott DM. The Effect of Nucleotomy and the Dependence on Degeneration of Human Intervertebral Disc Strain in Axial Compression, *Spine*, 36(21): 1765-71, 2011. PMID: PMC3146972.
8. **O'Connell GD**, Sen S, Elliott DM. Human Annulus Fibrosus Material Properties from Biaxial Testing and Constitutive Modeling are Altered with Degeneration, *BMMB*, 11(3-4): 493-503, 2011. PMID: 21748426.
9. Sampat S\*, **O'Connell GD\***, Fong JV, Augaron EA, Ateshian GA, Hung CT. Growth Factor Priming of Synovium Derived Stem Cells for Cartilage Tissue Engineering, *Tissue Engineering Part A*, 17(17-18): 2259-65, 2011. PMID: PMC3161099. *\*These authors contributed equally to the study and manuscript.*
10. **O'Connell GD**, Lima EK, Bian L, Chahine NO, Albro MB, Cook JL Ateshian GA, Hung CT. Toward Engineering a Biological Joint Replacement. Invited review paper for the *Journal of Knee Surgery*; 25(3): 187-96, 2012. PMID: PMC3700804.
11. **O'Connell GD**, Fong JV, Dunleavy N, Joff A, Ateshian GA, Hung CT. Trimethylamine N-Oxide found in shark cartilage improves collagen production in tissue-engineered cartilage. *Journal of Orthopaedic Research*, 30(12): 1898-905, 2012. PMID: PMC3625430
12. Kelly TAN, Roach BL, Weidner ZD, Mackenzie-Smith CR, **O'Connell GD**, Lima EG, Stoker AM, Cook JL, Ateshian GA, Hung CT. Tissue-engineered articular cartilage exhibits tension-compression nonlinearity reminiscent of the native cartilage. *Journal of Biomechanics*, Jul 26; 46(11): 1748-91, 2013. PMID: PMC3713158.
13. **O'Connell GD**, Nims R, Green J, Cigan A, Ateshian GA, Hung CT. Time and dose-dependent effects of chondroitinase ABC on growth of engineered cartilage. *eCells and Materials Journal*, 27:312-20, 2014. PMID: PMC4096549.
14. Ponnurangam S, **O'Connell GD**, Chernyshova I, Woods K, Somasundaran P, Hung CT. Ceria nanoparticles modulate development and interleukin response of chondrocyte-seeded hydrogel constructs. *Tissue Engineering, Part A*, Nov; 20(21-22):2908-19, 2014.
15. **O'Connell GD**, Newman IB, Carapezza MA. Effect of long-term osmotic loading culture on matrix synthesis from intervertebral disc cells. PMID: 25371861 *BioResearch*, Oct 1; 3(5):242-9, 2014. PMID: PMC4215332.
16. Tan AR, Alegre-Aguaron E, **O'Connell GD**, VandenBerg CD, Aaron RK, Vunjak-Novakovic G, Bulinski JC, Ateshian GA, Hung CT. Passage-Dependent Relationship between Mesenchymal Stem Cell Mobilization and Chondrogenic Potential. PMID: 25452155 *Osteoarthritis and Cartilage*, 23:319-327, 2015.

17. Stannard JT, Edamura K, Stoker A, **O'Connell GD**, Kuroki K, Hung CT, Choma TJ, Kuhns CA, Jefferies JT, Reinsel T, Cook, JL. Development of a Whole Organ Culture Model for Intervertebral Disc Disease. *Journal of Orthopaedic Translation*, Apr., 5: 1-8, 2015.
18. **O'Connell GD\***, Tan AR\*, Palmer G, Cui V, Bulinski JC, Cook JL, Attur M, Abramson SB, Ateshian GA, Hung CT. Human chondrocyte migration behavior to guide the development of engineered cartilage. *Journal of Tissue Engineering and Regenerative Medicine*, PMID: 25627968, 2015 (10.1002/term.1988). \*These authors contributed equally to the study and manuscript.
19. Bezci SE, Nandy A, **O'Connell GD**. Effect of hydration on healthy intervertebral disc stiffness. *Journal of Biomechanical Engineering*, Oct 1; 137(10), 2015. PMID: 26300418
20. **O'Connell GD**, Leach K, Klineberg E. Tissue engineering a biological repair strategy for lumbar disc herniation. *BioResearch*, Nov 1; 4(1): 431-45, 2015. PMID: 26634189
21. Ponnurangam S, **O'Connell GD**, Hung CT, and Somasundaran P, Biocompatibility of Polysebacic Anhydride Microparticles with Chondrocytes in Engineered Cartilage. *Colloids and Surfaces B: Biointerfaces*, Dec 1;136:207-13, 2015. PMID: 26398146
22. Nover AB, Hou GY, Han Y, Wang S, **O'Connell GD**, Ateshian GA, Konofagou EE, Hung CT. High Intensity Focused Ultrasound as a Tool for Tissue Engineering: Application to Cartilage. *Med Eng Phys*, Feb; 38(2), 192-198, 2016. PMID: 26724968
23. Werbner BN, Zhou M, **O'Connell GD**. A Novel Method for Repeatable Failure Testing of Annulus Fibrosus. *J Biomech Eng*. Nov. 1; 139(11). PMID: 28886203
24. Yang B, **O'Connell GD**. Effect of collagen fibre orientation on intervertebral disc torsion mechanics. *Biomech and Modeling in Mechanobiology*. Dec.; 16(6): 2005-15, 2017. PMID: 28733922
25. **O'Connell GD**, Garcia J, Jamali A. 3D Bioprinting: New directions in articular cartilage tissue engineering. *ACS Biomaterials Science & Engineering*. In Press, 01/2017.
26. Bezci SE, **O'Connell GD**. Osmotic pressure alters time-dependent recovery behavior of the intervertebral disc. *Spine – In Press*, 07/17. PMID: 28767637
27. Bezci SE, Klineberg EO, **O'Connell GD**. Effects of Axial Compression and Rotation Angle on Intervertebral Disc Mechanics in Torsion. *J Mech Beh Biomed Materials*. Jan.; 77:353-359, 2018. PMID: 28965042
28. Ford AC, Chui WF, Zeng AY, Nandy A, Liebenberg MA, Carraro C, Kazakia G, Alliston T, **O'Connell GD**. A Modular Approach to Creating Large Engineered Cartilage Surfaces. *J Biomech. – In Press*, 12/2017
29. Bezci SE, Eleswarapu A, Klineberg EO, **O'Connell GD**. Contribution of facets, axial compression, and composition on human lumbar discs in torsion. *JOR – In Press*, 01/2018
30. Yang B, **O'Connell GD**. Effect of fiber orientation and lamella structure on tissue swelling and residual stress formation. *JBMMB– In Press*, 03/2018.

## CONFERENCE PUBLICATIONS

1. **O'Connell GD**, Vresilovic EJ, Elliott DM. Comparative Intervertebral Disc Anatomy Across Several Animal Species. Abstract for podium presentation, 52<sup>nd</sup> Annual Orthopedic Research Society, Paper No. 0011, Chicago, IL USA, 2006.
2. **O'Connell GD**, Johannessen W, Vresilovic EJ, Elliott DM. Human Disc Internal Strains Under Compression Using Magnetic Resonance Imaging. Abstract for podium presentation, 53<sup>rd</sup> Annual Orthopedic Research Society, Paper No. 0270, San Diego, CA USA, 2007.
3. **O'Connell GD**. Multiscale Mechanics of the Intervertebral Disc. Abstract for podium presentation to the 2<sup>nd</sup> Annual USACM Meeting, Berkeley, CA USA 02/2014.
4. **O'Connell GD**, Vresilovic EJ, Elliott DM. Recovery of Human Intervertebral Disc Motion Segments Following Axial Compression Loading. Abstract for poster presentation, 6th Annual Combined Meeting of the Orthopaedic Research Societies, Paper No 274, Honolulu, HI USA, 2007.

5. Baker BM, **O'Connell GD**, Sen S, Nathan AS, Elliott DM, Mauck RL. Multi-Lamellar and Multi-Axial Maturation of Cell-Seeded Fiber-Reinforced Tissue Engineered Constructs. ASME Bioengineering Conference, SBC2007-176434, Keystone, CO USA, 2007.
6. **O'Connell GD**, Sen S, Baker BM, Mauck RL, Elliott DM. Biaxial Mechanics of Musculoskeletal Tissue and Fiber-Reinforced Scaffolds. Abstract for podium presentation, ASME Bioengineering Conference, SBC2007-176540, Keystone, CO USA, 2007.
7. **O'Connell GD**, Vresilovic EJ, Elliott DM. Recovery of Human Disc Height and Stiffness Following Axial Compression. Abstract for poster presentation, 54<sup>th</sup> Annual Orthopedic Research Society, Paper No. 1435, San Francisco, CA USA, 2008.
8. **O'Connell GD**, Guerin HL, Elliott DM. An Anisotropic Hyperelastic Model Applied to Nondegenerate and Degenerate Annulus Fibrosus. Abstract for podium presentation, ASME Bioengineering Conference, SBC2008-192890, Marco Island, FL USA, 2008.
9. Wright AC, Horng D, **O'Connell GD**, Elliott DM. Diffusion Tensor MRI on Human Disc Tissue at 90 mm Isotropic Resolution. Abstract for poster presentation, 55th Annual Meeting of the Orthopaedic Research Society, Las Vegas, NV USA, 2009.
10. **O'Connell GD**, Jacobs JT, Sen S, Vresilovic EJ, Elliott DM. Viscoelastic Recovery of the Human Intervertebral Disc is Much Slower than Creep. Abstract for poster presentation, 55th Annual Meeting of the Orthopaedic Research Society, Las Vegas, NV USA, 2009.
11. **O'Connell GD**, Vresilovic EJ, Elliott DM. Degeneration Alters Intradiscal Strains Under Compression and Bending Loading. Abstract for podium presentation, 55th Annual Meeting of the Orthopaedic Research Society, Las Vegas, NV USA, 2009.
12. **O'Connell GD**, Sen S, Elliott DM. Physiological Biaxial Boundary Conditions Affects Stress-Stretch Behavior of the Annulus Fibrosus. Abstract for podium presentation, 55th Annual Meeting of the Orthopaedic Research Society, 2009.
13. **O'Connell GD**, Malhotra NR, Vresilovic EJ, Elliott DM. Discectomy Increases Internal Strains of the Disc Under Physiological Loads. Abstract for special emphasis poster presentation, Annual Meeting of the International Society for the Study of Lumbar Spine (ISSLS), Miami, FL USA, 2009.
14. **O'Connell GD**, Sen S, Cortes DH, Elliott DM. Biaxial Mechanics are Inhomogenous and Altered with Degeneration in the Human Annulus Fibrosus. Abstract for poster presentation, 56<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, New Orleans, LA USA, 2010.
15. **O'Connell GD**, Malhotra NR, Vresilovic EJ, Elliott DM. Discectomy Alters The Internal Strains of the Intervertebral Disc. Abstract for podium presentation, 56<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, New Orleans, LA USA, 2010.
16. Gunja N, Fong JV, Tan AR, Moy MY, Xu D, **O'Connell GD**, Bulinski JC, Ateshian GA, Hung CT. Priming of Synovium-Derived Mesenchymal Stem Cells for Cartilage Tissue Engineering. Abstract for podium presentation, ASME Bioengineering Conference, Naples, FL USA, 2010.
17. Sampat SR, **O'Connell GD**, Fong JV, Ateshian GA, Hung CT. Optimization of Synovium-Derived Stem Cells for Cartilage Tissue Engineering. Abstract for poster presentation, 57<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, Long Beach, CA, USA, 2011.
18. **O'Connell GD**, Fong JV, Joffe A, Moy MY, Newman IB, Hung CT. Trimethylamine N-Oxide enhances the Mechanical and Biochemical Properties of Tissue Engineered Cartilage. Abstract for poster presentation, 57<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, 2011.
19. Nover AB, **O'Connell GD**, Ateshian GA, Lima EG, Konofagou EE, Hung CT. A Focused Ultrasound Technique for Modulating Local Tissue Properties for Articular Cartilage Tissue Engineering. Abstract for podium presentation, 57<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, Long Beach, CA USA, 2011.
20. Ponnurangam S, **O'Connell GD**, Chernyshova IV, Hung CT, Somasundaran P. Acrylate Copolymeric

- Nanogels for Tissue Engineering of Articular Cartilage. Abstract for poster presentation, National Meeting of the American Chemistry Society (ACS), Anaheim, CA, USA, 2011.
21. Luengo AS, **O'Connell GD**. Annulus Fibrosus Cells as a Potential Cell Source for Nucleus Pulposus Tissue Engineering. Abstract for poster presentation, BMES Conference, Hartford, CT USA, 2011.
  22. **O'Connell GD**, Dunleavy N, Carapezza M, Ateshian GA, Hung CT. TMAO Supplementation of Culture Media for Engineered Articular Cartilage. Abstract for podium presentation, BMES Conference, Hartford, CT, USA, 2011.
  23. Nover AB, **O'Connell GD**, Ateshian GA, Lima EG, Konofagou EE, Hung CT. Effects of Focused Ultrasounds on Cell Viability in Its Application to Articular Cartilage Engineering. Abstract for poster presentation, BMES Conference, Hartford, CT, USA, 2011.
  24. **O'Connell GD**, Gollnick C, Ateshian GA, Bellamkonda RV, Hung CT. Beneficial Effects of Chondroitinase ABC Release From Lipid Microtubes Encapsulated in Chondrocyte-Seeded Hydrogel Construct. Abstract for poster presentation, ASME Bioengineering Conference, Farmington, PA USA, 2011.
  25. **O'Connell GD**, Hung CT, Ateshian GA. Experimental and Theoretical Evaluation of Failure Properties for Immature Tissue Engineered Cartilage. Abstract for poster presentation, ASME Bioengineering Conference, Farmington, PA USA, 2011.
  26. Gerasimowicz KM, Yoder JH, Tustison NJ, Song G, **O'Connell GD**, Malhotra NR, Vresilovic EJ, Wright AC, Gee JC, Elliott DM. Optimization of Image Registration and Application to Human Disc Mechanics with Nucleotomy. Abstract for podium presentation, Northeast Bioengineering Conference (NEBEC), Toronto, Canada, 2011.
  27. **O'Connell GD**, Newman IB, Carapezza M, Urban JP, Hung CT. Osmotic Loading Effects on Juvenile Intervertebral Disc Cell Biosynthesis is Dependent on Cell Type and TGF- $\beta$ 3. Abstract for poster presentation, 58<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, San Francisco, CA USA, 2012.
  28. **O'Connell GD**, Carapezza M, Newman IB, Ateshian GA, Hung CT. Applied Dynamic Loading Following chABC Digestion Increases Collagen Production in Engineered Cartilage. Abstract for poster presentation, 58<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, San Francisco, CA USA, 2012.
  29. Edamura K, Stannard JT, Stoker AM, **O'Connell GD**, Kuroki K, Hung CT, Choma TJ, Jeffries JT, Cook JL. A Whole Organ Culture Model for Intervertebral Disc Using Rat Tail Explants in a Rotating Bioreactor. Abstract for poster presentation, 58<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, San Francisco, CA USA, 2012.
  30. Ponnurangam, S, **O'Connell GD**, Somasundaran P, Hung CT. Microgel-based Delivery of Soluble Factors for Articular Cartilage Engineering. Abstract for poster presentation, 58<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, San Francisco, CA USA, 2012.
  31. Nover A, Ye M, Samojilk S, **O'Connell GD**, Ateshian GA, Lima EG, Hung CT. The Influence of Dynamic Loading on Bio-Titanium Hybrid Osteochondral Tissue Engineered Constructs. Abstract for poster presentation, 58<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, San Francisco, CA USA, 2012.
  32. Stannard JT, Edamura K, Stoker A, **O'Connell GD**, Kuroki K, Hung CT, Choma TJ, Kuhns CA, Jefferies JT, Reinsel T, Cook, JL. A novel model for intervertebral disc degeneration using whole organ explants in a rotating bioreactor. Abstract for podium presentation, 27<sup>th</sup> NASS Annual Meeting, Houston, TX, 2012.
  33. **O'Connell GD**, Gollnick C, Ateshian GA, Bellamkonda RV, Hung CT. Lipid Microtubes Improve Nutrient Transport in Engineered Cartilage. Abstract for podium presentation, 58<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, San Francisco, CA USA, 2012.
  34. **O'Connell GD**, Gollnick C, Ateshian GA, Bellamkonda RV, Hung CT. Lipid Microtubes as a Nutrient Reservoir or Enzyme Delivery Vehicle in Engineered Cartilage. Abstract for poster presentation, ASME

Summer Bioengineering Conference, Fajardo, PR USA, 2012.

35. Nover AB, Wood KC, **O'Connell GD**, Essner AP, Klein RW, Napolitano AP, Lima EG, Ateshian GA, Hung CT. Characterization Of Depth-Dependent Mechanical Properties In Bio-Titanium Hybrid Osteochondral Tissue Engineered Constructs. Abstract for poster presentation, ASME Summer Bioengineering Conference, Fajardo, PR USA, 2012.
36. Stannard JT, Edamura K, Stoker A, **O'Connell GD**, Kuroki K, Hung CT, Choma TJ, Kuhns CA, Jefferies JT, Reinsel T, Cook, JL. A whole organ culture model for intervertebral disc using rat tail explants in a rotating bioreactor. Abstract for poster presentation, World Spine Forum, Helsinki, Finland, 2012.
37. Ponnurangam S, **O'Connell GD**, Somasundaran P, Hung CT. Microgel-based Delivery of Bioactive Soluble Factors for Articular Cartilage Engineering. Abstract for poster presentation, National Meeting of the American Chemistry Society (ACS), Philadelphia, PA USA, 2012.
38. Nims R, Cigan A, Albros M, **O'Connell GD**, Park D, Hung CT, Ateshian GA. Frequent Chondroitinase Treatment in Engineered Cartilage with Native Level of Cell Seeding Density Does Not Enhance Collagen Deposition and is Detrimental to Chondrocytes. Abstract for poster presentation, 59<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, San Antonio, TX USA, 2013.
39. Kelly TAN, Roach BL, Mackenzie-Smith CR, **O'Connell GD**, Ateshian GA, Hung CT. Chondroitinase ABC-Treatment Enhances Tension Compression Nonlinearity in Tissue-Engineered Articular Cartilage. Abstract for poster presentation, 59<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, San Antonio, TX USA, 2013.
40. Ponnurangam S, Chernyshova I, **O'Connell GD**, Woods K, Hung CT, Somasundaran P. Ceria Nanoparticles as Anti-inflammatory Agent in Engineered Articular Cartilage: *In vitro* Raman Microspectroscopy of Single Cells. Abstract for poster presentation, National Meeting of the American Chemistry Society (ACS), New Orleans, LA USA, 2013.
41. Kelly TAN, Roach BL, Mackenzie-Smith CR, Nover AB, Estell EG, **O'Connell GD**, Ateshian GA, Hung CT. Chondroitinase ABC-Digestion and Dynamic Loading Increased Tension-Compression Nonlinearity in Tissue-Engineered Cartilage. Abstract for podium presentation, ASME Summer Bioengineering Conference, Sunriver, OR USA, 06/2013.
42. **O'Connell GD**, Cui VH, Nims RJ, Nover AB, Ateshian GA, Hung CT. Prolonged Treatment of Ultra-Low Dose Chondroitinase ABC Improves Matrix Production in Engineered Cartilage. Abstract for podium presentation, ASME Summer Bioengineering Conference, Sunriver, OR USA, 06/2013.
43. **O'Connell GD**, Cui VH, Palmer G, Hung CT. Differences in Engineered Cartilage from Human Chondrocytes and Mesenchymal Stem Cells in Pellet and Construct Culture. Abstract for poster presentation, to ASME Summer Bioengineering Conference, Sunriver, OR USA, 06/2013.
44. **O'Connell GD**. Multiscale Mechanics of the Intervertebral Disc. Abstract for podium presentation to the 2<sup>nd</sup> Annual USACM Meeting, Berkeley, CA USA 02/2014.
45. **O'Connell GD**, Carapezza MA, Newman IB. Osmotic Loading and Growth Factor Supplementation Alters Tissue Growth of Intervertebral Disc Cells. Abstract accepted for podium presentation to 60<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, New Orleans, LA USA, 03/2014.
46. Bezci SE, Felipe JM, **O'Connell GD**. Osmotic loading environment alters intervertebral disc mechanical function. Abstract selected as a finalist to the Bachelor's student competition to the 7<sup>th</sup> World Bioengineering Conference, Boston, MA USA, 07/2014.
47. Bezci SE, **O'Connell GD**. Effect of axial compression on intervertebral disc torsional mechanics. Abstract for poster presentation to the International Society for the Study of the Lumbar Spine (ISSLS) Annual Meeting, San Francisco, CA USA, 06/2015.
48. Ford AC, Wolf K, Nandy A, Zeng AY, **O'Connell GD**. Modular tissue engineered cartilage surfaces. Abstract for poster presentation to the Annual Summer Bioengineering Conference (SBC), Snowbird,

UT USA, 06/2015.

49. Bezci SE, **O'Connell GD**. Effect of axial compression on intervertebral disc torsional mechanics. Abstract for poster presentation to the Annual Summer Bioengineering Conference (SBC), Snowbird, UT USA, 06/2015.
50. Bezci SE, **O'Connell GD**. Effect of rotation angle in disc torsional mechanics. Abstract for poster presentation to the American Society of Biomechanics (ASB) 39<sup>th</sup> Annual Meeting, Columbus, OH USA, 08/2015.
51. Ford AC, Chui WF, Zeng AY, Nandy A, Liebenberg E, Alliston T, **O'Connell GD**. Large-Scale Engineered Cartilage Surfaces with Evenly Distributed Properties. Abstract for poster presentation at the Annual Orthopaedic Research Society Meeting, Orlando, FL, 03/2016.
52. Bezci SE, **O'Connell GD**. Axial-torsion behavior of human lumbar intervertebral discs under physiological compressive loads. Abstract for poster presentation at the Annual Orthopaedic Research Society Meeting, Orlando, FL, 03/2016.
53. Yang, B, **O'Connell GD**. Effect of Annulus Fibrosus Collagen Orientation on Intervertebral Disc Torsional Mechanical Behavior. Abstract for podium presentation at the Annual Orthopaedic Research Society Meeting, Orlando, FL, 03/2016.
54. Bezci SE, **O'Connell GD**. Compression-torsion mechanical properties of the human intervertebral joint. Abstract for podium presentation to the International Society for the Study of the Lumbar Spine (ISSLS) Annual Meeting, Singapore, 05/2016.
55. Pendleton MM, Alwood JS, **O'Connell GD**, Keaveny TM. Design of Fatigue Test for Ex-Vivo Mouse Vertebra. Abstract for podium presentation to the Summer Biomechanics, Bioengineering, and Biotransport Conference (SB3C), National Harbor, MD, 06/2016.
56. Bezci SE, **O'Connell GD**. Effect of Hydration on Intervertebral Disc Recovery. Abstract for poster presentation to the Summer Biomechanics, Bioengineering, and Biotransport Conference (SB3C), National Harbor, MD, 06/2016. *MS Paper Competition Finalist*.
57. Yang B, Zhou M, **O'Connell GD**. Detailed Finite Element Modeling of Fiber-Reinforced Tissues. Abstract for poster presentation to the Summer Biomechanics, Bioengineering, and Biotransport Conference (SB3C), National Harbor, MD, 06/2016
58. Bonnheim N\*, Werbner B\*, **O'Connell GD**. Failure Properties of Annulus Fibrosus: Effects of chABC and Strain Rate. Abstract for podium presentation to the Summer Biomechanics, Bioengineering, and Biotransport Conference (SB3C), National Harbor, MD, 06/2016. *\*These authors contributed equally*.
59. Change JM, Emerzian SR, Pendleton MM, Keaveny TM, **O'Connell GD**. Robust Method for Mechanical Testing of Rat Vertebrae to Determine Compressive Bone Properties. Abstract for poster presentation to the Annual BioMedical Engineering Society (BMES) Conference, Minneapolis, MN, 10/2016.
60. Yang B, Zhou M, **O'Connell GD**. Osmotic Swelling Alters Tissue Mechanics in Fiber-Reinforced Tissues. Abstract for poster presentation at the Annual Orthopaedic Research Society Meeting, San Diego, CA, 03/2017.
61. Werbner B, **O'Connell GD**. A Method for Repeatable Tensile Total-Life Fatigue Testing of Annulus Fibrosus. Abstract for poster presentation at the Annual Orthopaedic Research Society Meeting, San Diego, CA, 03/2017.
62. Wendland M, **O'Connell GD**. Herniation and Hydration Alters Quantitative MRI Parameters of the Intervertebral Disc. Abstract for poster presentation at the Annual Orthopaedic Research Society Meeting, San Diego, CA, 03/2017.
63. **O'Connell GD**. Cartilage tissue engineering: using soft material scaffolds. Abstract for oral presentation to the 253<sup>rd</sup> Annual American Chemical Society – Division of Polymeric Materials and Science Engineering (PSME), San Francisco, CA 04/2017.

64. Yang B, Jbaily A, Yintong L, Szeri AJ, **O'Connell GD**. Lung micromechanics of pulmonary fibrosis: A finite element analysis. Abstract for poster presentation to the Summer Biomechanics, Bioengineering, and Biotransport Conference (SB3C), Tucson, AZ 06/2017.
65. Yang B, Habtegebriel YB, Ma Y, Wendland MF, **O'Connell GD**. A semi-automated approach for creating a subject-specific finite element model of the intervertebral disc. Abstract for poster presentation to the Summer Biomechanics, Bioengineering, and Biotransport Conference (SB3C), Tucson, AZ 06/2017.
66. Yang B, **O'Connell GD**. Effect of osmotic swelling in soft tissue is dependent on collagen fiber orientation. Abstract for podium presentation to the Summer Biomechanics, Bioengineering, and Biotransport Conference (SB3C), Tucson, AZ 06/2017. *PhD Paper Competition Finalist*.
67. Werbner B\*, Zhou M\*, **O'Connell GD**. Finite element method for predicting failure location of annulus fibrosus in uniaxial tension. Abstract for poster presentation to the Summer Biomechanics, Bioengineering, and Biotransport Conference (SB3C), Tucson, AZ 06/2017. *\*These authors contributed equally*.
68. Zhou M\*, Werbner B\*, **O'Connell GD**. Effect of fiber architecture on tissue failure dynamics: A finite element study. Abstract selected as finalist in the MS Paper Competition to the Summer Biomechanics, Bioengineering, and Biotransport Conference (SB3C), Tucson, AZ 06/2017. *\*These authors contributed equally. MS Paper Competition Finalist*.
69. Pendleton MM, Sadoughi S, Li A, Liu JW, **O'Connell GD**, Alwood JS, and Keaveny TM. Effect of spaceflight-relevant ionizing radiation on mechanical properties of mouse vertebrae for repetitive loading. Abstract for poster presentation at ASBMR, Denver, CO 09/2017
70. López-Marcial GR, Zeng AY, Osuna C, García JM, **O'Connell GD**. Agarose-alginate hydrogels as suitable bioprinting materials. Abstract for poster presentation at the Annual Orthopaedic Research Society Meeting, New Orleans, 03/2018.
71. Bezci SE, **O'Connell GD**. Disc torsional mechanics are influenced by axial compression, rotation angle, and disc geometry. Abstract for poster presentation at the Annual Orthopaedic Research Society Meeting, New Orleans, 03/2018.
72. Zhou M, **O'Connell GD**. Swelling affects failure mechanics of the annulus fibrosus. Abstract for poster presentation at the Annual Orthopaedic Research Society Meeting, New Orleans, 03/2018.
73. Emerzian SR, Pendleton MM, Li A, Liu JW, Tang SY, Alwood JS, **O'Connell GD**, Keaveny TM. Effect of ex vivo ionizing radiation on static and fatigue properties of mouse vertebral bodies. Abstract for podium presentation at the Annual Orthopaedic Research Society Meeting, New Orleans, 03/2018.
74. Zhou M, Bezci SE, **O'Connell GD**. Effects of specimen geometry and boundary conditions on fiber engagement and mechanical properties. Abstract for podium presentation at the Annual Orthopaedic Research Society Meeting, New Orleans, 03/2018.
75. Yang B, Um C, Lu Y, **O'Connell GD**. Effect of Nucleus Pulposus Size and Location on Internal Stresses in the Intervertebral Disc. Abstract for poster presentation at the World Congress of Biomechanics Meeting, Dublin, Ireland, 07/2018.
76. Eskandari M, **O'Connell GD**. Mechanical Characterization of Lung Tissue. Abstract for poster presentation at the World Congress of Biomechanics, Dublin, Ireland, 07/2018.
77. Zhou M, Bezci SE, Borroni-Bird CL, **O'Connell GD**. Modulus of Fiber-Reinforced Tissues is Sensitive to Specimen Dimension. Abstract for poster presentation at the World Congress of Biomechanics Meeting, Dublin, Ireland, 07/2018.
78. Yang B, Lu Y, Um C, **O'Connell GD**. Nucleotomy Increases Disc Bending Stiffness under Complex Loading Modalities. Abstract for podium presentation at the World Congress of Biomechanics Meeting, Dublin, Ireland, 07/2018.
79. Yang B, **O'Connell GD**. Abstract for podium presentation at the World Congress of Biomechanics



Meeting, Dublin, Ireland, 07/2018.

80. Emerzian SR, Pendleton MM, Li A, Liu JW, Tang SY, Alwood JS, **O'Connell GD**, Keaveny TM. Exposure to *ex vivo* sterilization doses of ionizing radiation diminishes collagen integrity and mechanical properties of whole bones. Abstract submitted for the 8<sup>th</sup> World Congress of Biomechanics, Dublin, Ireland, 2018.

## **PUBLICATIONS IN REVIEW**

### JOURNAL ARTICLES

1. López-Marcial GR, Zeng AY, Osuna C, García JM\*, **O'Connell GD\***. Characterization of Printable Bioinks for Cartilage Tissue Engineering. \* co-corresponding authors. *ACS Biomaterials – In Review*, 12/2017.

### CONFERENCE PROCEEDINGS

1. Lim D, Georgiou T, Bhardwaj A, **O'Connell GD**, Agogino AM. Customization of a 3D Printed Prosthetic Finger Using Parametric Modeling. *ASME – IDETC/CIE*, 03/2018.

## **BOOK CHAPTERS**

1. **O'Connell GD**, Lima EK, Bian L, Chahine NO, Albro MB, Cook JL, Ateshian GA, Hung CT. *Chapter 15: Toward Engineering a Biological Joint Replacement*. Articular Cartilage Injury of the Knee, 162-74, 2013.

## **AWARDS & HONORS**

- |      |   |
|------|---|
| 2000 | Society of Women Engineer (SWE) Award for Mathematics   |
| 2004 | Inducted into Sigma Gamma Tau (honor society for Aerospace Engineering)   |
| 2004 | Graduate Diversity Fellowship, University of Pennsylvania   |
| 2007 | East Asia Summer Fellowship (NSF-EAPSI) in Taipei, Taiwan at National Taiwan University (Dr. Jaw-Lin Wang)  |
| 2008 | National Institutes of Health Pre-doctoral Fellowship, University of Pennsylvania   |
| 2009 | National Institutes of Health Diversity Fellowship, Columbia University   |
| 2011 | Federation of American Societies for Experimental Biology (FASEB) Postdoctoral Professional Development and Enrichment Award                                |
| 2014 | Association of Women in Mathematics Travel Grant  |
| 2014 | Regents' Junior Faculty Fellow, University of California  |
| 2014 | Rose Hills Innovator Award, University of California, Berkeley  |
| 2015 | Hellman Family Faculty Award, University of California, Berkeley  |
| 2015 | Grainger Foundation Frontiers of Engineering Grant through the National Academy of Engineers (co-awardee: Jeannette Garcia at IBM)                          |
| 2016 | Minner Faculty Fellow in Engineering Ethics and Professional/Social Responsibility, University of California, Berkeley                                      |
| 2017 | Finalist for ORS Spine Section Poster Award, Orthopaedic Research Society Meeting (San Diego, CA)   |
| 2017 | Polymeric Materials: Science and Engineering (PMSE) Young Investigator  |
| 2017 | Diablo Magazine's 40 Under 40   |
| 2017 | Journal of Biomechanical Engineering Editors Choice Paper for 2017 for the paper titled "A Novel Method for Repeatable Failure Testing of Annulus Fibrosus" |
| 2018 | Arthritis National Research Foundation John Vaughan Scholar   |
| 2018 | NSF CAREER Award  |

## **INVITED TALKS & KEYNOTE PRESENTATIONS**

- April 2011 Orthopaedic Research Day, University of Missouri, MO; *Title – Noninvasive Assessment Of Intervertebral Disc Biomechanics*
- Dec. 2011 Mechanical Engineering Seminar Series, University of Connecticut, Storrs, CT; *Title - Soft Tissue Biomechanics and Functional Tissue Engineering*
- Feb. 2012 Mechanical Engineering Seminar Series, Washington University, St. Louis, MO; *Title - Soft Tissue Biomechanics and Functional Tissue Engineering*
- Mar. 2012 Bioengineering Seminar Series, Yale University, New Haven, CT; *Title - Soft Tissue Biomechanics and Functional Tissue Engineering*
- Mar. 2012 Mechanical Engineering Seminar Series, Georgia Technological Institute, Atlanta, GA; *Title - Soft Tissue Biomechanics and Functional Tissue Engineering*
- Sept. 2012 Mechanical Engineering Seminar Series, Eindhoven University of Technology, Eindhoven, Netherlands; *Title - Soft Tissue Biomechanics and Functional Tissue Engineering*
- Feb. 2013 Biomedical Engineering Seminar Series, City College of New York, NY; *Title - Soft Tissue Biomechanics and Functional Tissue Engineering*
- Nov. 2013 Bioengineering Seminar Series, University of California, Davis, CA; *Title - Soft Tissue Biomechanics and Functional Tissue Engineering*
- Mar. 2014 UC Berkeley Nanosciences and Nanoengineering Institute (BNNI) Seminar Series, Berkeley, CA; *Title - Engineering Biological Tissues for Relieving Back Pain*
- Apr. 2014 Mechanical Engineering Seminar Series, Stanford University, Palo Alto, CA; *Title - Engineering Biological Tissues for Relieving Back Pain*
- May 2014 Orthopaedic Surgery and Radiology Departments UCSF, San Francisco, CA; *Title - Towards Developing Personalized Cartilage Repair*
- Apr. 2015 Keynote Address, Society of Women Engineers, University of California, Berkeley
- May 2015 Biomechanics Seminar Series, Department of Mechanical Engineering, UC San Diego, CA; *Title - Towards Developing Personalized Cartilage Repair*
- Oct. 2015 Biomaterials Seminar, IBM Almaden Research Center, San Jose, CA; *Title - Developing Patient-Specific Engineered Cartilage Using Soft Biomaterial Scaffolds*
- Jan. 2016 MedTech Frontiers Seminar Series, Triple Ring Technologies, Newark, CA; *Title - Developing Personalized Cartilage Repair*
- July 2016 Institute of Orthopaedic Research and Biomechanics, University Hospital Ulm, Ulm, Germany; *Intervertebral Disc Biomechanics*
- Sept. 2016 Biomedical Engineering Seminar, Tulane University, New Orleans, LA; *Intervertebral Disc Biomechanics with Swelling and Injury*
- Oct. 2016 Keynote, Blue & Gold Leadership Dinner, UC Berkeley (College of Engineering & Engineering Student Council)
- Feb. 2017 Lawrence-Berkeley National Laboratory, Berkeley, CA; *Intervertebral Disc Biomechanics with Swelling and Injury*
- Mar. 2017 The Buck Institute for Research on Aging, Novato, CA; *Intervertebral Disc Biomechanics with Swelling and Injury*
- Apr. 2017 253<sup>rd</sup> American Chemical Society Annual Meeting, Polymer Materials and Science Engineering Division Young Investigator Symposium, San Francisco; *Cartilage tissue engineering: using soft material scaffolds*
- June 2017 European Chapter Meeting of the Tissue Engineering and Regenerative Medicine International Society 2017, Davos, Switzerland; *Design Considerations for Repairing the Annulus Fibrosus (Not given due to weather impacted travel)*
- Sept. 2017 Mechanical Engineering Seminar, Johns Hopkins University, Baltimore, MD; *Intervertebral Disc Biomechanics with Swelling and Injury*
- Sept. 2017 Bioengineering Seminar, University of Delaware, Newark, DE; *Intervertebral Disc Biomechanics with Swelling and Injury*

- Sept. 2017 Mechanical Engineering Seminar, Cornell University, Ithaca, NY; *Intervertebral Disc Biomechanics with Swelling and Injury*
- Sept. 2017 Mechanical Engineering Seminar, Michigan State University, East Lansing, MI; *Intervertebral Disc Biomechanics with Swelling and Injury*
- Nov. 2017 Society of Women Engineers (SWE) Mini-University, University of California – Berkeley
- Jan. 2018 UC Berkeley – Autodesk Symposium, Berkeley, CA; *Towards Patient Specific Planning for Spine Surgery*

## **PATENTS**

- Apr. 2016 Tissue Culture Method For Producing Cartilage Using Trimethylamine N-Oxide and Chondroitinase (Inventors: Clark T. Hung, PhD and Grace D. O’Connell, PhD; Columbia University; Patent no. 9321993)

## **ADVISEES**

### CURRENT RESEARCH GROUP MEMBERS

#### Graduate Students

- 2014 - Ms. Megan Pendleton, Mechanical Engineering PhD Candidate, NASA Space Technology Research Fellow
- 2014 - Mr. Bo Yang, Mechanical Engineering PhD Candidate, J.K. Lee Fellow
- 2015 - Mr. Semih Bezci, Mechanical Engineering PhD Candidate, William C. Webster Graduate Fellow
- 2015 - Ms. Shannon McBride, Mechanical Engineering PhD Graduate Student, UC Berkeley Graduate Fellow, NSF Graduate Fellow
- 2015 - Mr. Minhao Zhou, Mechanical Engineering PhD Graduate Student, Finnie Fellow
- 2015 - Mr. Benjamin Werbner, Mechanical Engineering Graduate Student
- 2016 - Mr. Gabriel Lopez, Mechanical Engineering Graduate Student, NSF Graduate Fellow
- 2017 - Mr. Emily Lindberg, Mechanical Engineering Graduate Student

#### Undergraduate Students

- 08/2016 - Mr. Aditya Goel, Letters & Sciences (Junior)
- 08/2016 - Ms. Yu Ma, Mathematics (Sophomore)
- 01/2017 - Mr. Albert Wang, Bioengineering Undergraduate Student
- 01/2017 - Mr. Aditya Goel, Molecular Cell & Biology
- 05/2017 - Ms. Katherine Spake, Mechanical Engineering (Senior)
- 08/2017 - Ms. Christina Laura Borroni-Bird, Mechanical Engineering (Senior)
- 08/2017 - Ms. Dominic Chiavacci, Bioengineering (Senior)
- 08/2017 - Mr. Matthew Sie, (Junior)
- 08/2017 - Mr. Max Sigerman, Mechanical Engineering (Junior)

### UNDERGRADUATE STUDENT ALUMNI

- 2007 – 2009 Mr. Sounok Sen, Bioengineering, University of Pennsylvania
- 2009 – 2012 Ms. Alba Luengo, Biomedical Engineering, Columbia University
- 2009 – 2011 Mr. Man-Yu Moy, Biomedical Engineering, Columbia University
- 2010 – 2012 Mr. Michael Carapezza, Biomedical Engineering, Columbia University
- 2010 – 2011 Ms. Isabella Newman, Biomedical Engineering, Columbia University
- 2011 – 2013 Ms. Victoria Cui, Biomedical Engineering, Columbia University
- 2011 – 2012 Ms. Kelly Lin, Biomedical Engineering, Columbia University
- 2013 – 2015 Mr. Semih Bezci, Mechanical Engineering
- 2013 – 2015 Mr. Joseph Felipe, Mechanical Engineering (*Position after lab: Engineer, Velo3D, Campbell, CA*)

2014 – 2015 Mr. Aditya Nandy, Chemical Engineering  
 2014 Mr. David Zarrin, Mechanical Engineering  
 2014 Mr. Zhengtang Yang, Mechanical Engineering  
 2014 Mr. Grant Alpert-Waldman, Mechanical Engineering  
 2014 - 2016 Ms. Naomi Kibrya, Mechanical Engineering Undergraduate Student (*Position after lab: Engineer, Stryker, Dallas, TX*)  
 2014 - 2017 Ms. Anne Zeng, Bioengineering Undergraduate Student  
 2015 Ms. Catherine Choi, Bioengineering Undergraduate Student  
 2015 - 2016 Mr. Gerald Santos, Mechanical Engineering Undergraduate Student (*Position after lab: Mechanical Engineer, Gilead Sciences, San Dimas, CA*)  
 2015 - 2017 Mr. Aran Bahl, Bioengineering Undergraduate Student (*Position after lab: Engineering Consultant, Accenture, San Francisco, CA*)  
 2015 - 2017 Ms. Yeabsra Habtegebriel, Mechanical Engineering  
 2015 - 2017 Mr. Wan Fung Chui, Electrical Engineering and Computer Science (*Position after lab: Medical Student at Harvard/MIT*)  
 2016 Ms. Hannah Tang, Bioengineering Undergraduate Student  
 2016 Mr. Zachary Chou, Bioengineering Undergraduate Student, QB3 Lab Fundamentals Bootcamp Scholar  
 2016 Mr. Arbaaz Shakir, Mechanical Engineering Undergraduate Student  
 2016 - 2017 Mr. Samuel Pliska, Mechanical Engineering Student  
 2016 - 2017 Ms. Rachel Perez Thomasson, Bioengineering  
 2016 - 2017 Mr. Samuel Pliska, Mechanical Engineering  
 2016 - 2017 Mr. Gary Hoang, Electrical Engineering and Computer Science

## VISITORS TO RESEARCH GROUP

### Graduate Researchers

2014 Mr. Andrew Burg, Mechanical Engineering Master's Student, Swiss Federal Institute of Technology (ETH), Zurich, Switzerland  
 08/2017 – 02/2018 Ms. Ellen van Rooji, Mechanical Engineering Master's Student, Eindhoven Technical University, Eindhoven, The Netherlands (Advisor: Prof. Keita Ito)

### Undergraduate Researchers

2014 Mr. Wenhao Deng, Chemical Engineering Undergraduate Student, Ohio State University  
 2016 Mr. Jason Chang, Biomedical Engineering Undergraduate Student, University of Texas – Dallas (Amgen Scholar)  
 2016 Mr. Massimo Terreri, Mechanical Engineering Undergraduate Student, Marche Polytechnic University, Ancona, Italy  
 2017 Ms. Kai Littlejohn, Chemical Engineering Undergraduate Student, Tuskegee University (Amgen Scholar)  
 2017 Mr. Carlos Osuna, Nanoengineering Undergraduate Student, UC San Diego (UC LEADS Program, Advisor: Professor Robert Sah)

**Graduate Research Assistants** (rotation term): Ms. Katelyn Cabral (2014), Ms. Kayla Wolf (2014), Ms. Sonal Sampat (2009-2010), Mr. Adam Nover (2010-2012), Mr. Sathish Ponnurangam (2010 – 2014), Nikhil Joshi (2010)

## **DISSERTATION COMMITTEE MEMBERSHIP** (*\*indicates committee chair*)

2014 - 2017 Ms. Ann Ouyang, UC Berkeley Bioengineering, "*Effects of Design Factors and Microenvironment on Mesenchymal Stem Cells and Nucleus Pulposus Cells for Intervertebral Disc Tissue Engineering*"

- 2014 - 2017 Ms. Britta Berg-Johansen, UC Berkeley Bioengineering, “*Characterization of the Spinal Disc-Vertebra Interface and its Relation to Back Pain and Injury*”
- 2014\* - 2017 Ms. Megan Pendleton, UC Berkeley Mechanical Engineering
- 2016 - Mr. Junghyun Kim, UC Berkeley Mechanical Engineering
- 2016 - Mr. Jiacheng Wu, UC Berkeley Mechanical Engineering
- 2016 - Mr. Adam Updegrave, UC Berkeley Mechanical Engineering
- 2016\* - Mr. Bo Yang, UC Berkeley Mechanical Engineering
- 2017 - Ms. Courtney Mazur, UC Berkeley Bioengineering
- 2017 - Mr. Logan Van Engelhoven, UC Berkeley Mechanical Engineering
- 2018\* - Mr. Semih Bezci, UC Berkeley Mechanical Engineering

**QUALIFYING EXAM COMMITTEE MEMBERSHIP** (\*indicates committee chair)

- 2014 Ms. Ann Ouyang, UC Berkeley Bioengineering (Advisor: Jeffery Lotz, UCSF)
- 2014 Ms. Britta Berg-Johansen, UC Berkeley Bioengineering (Advisor: Jeffery Lotz, UCSF)
- 2015 Mr. Andrew Bremer, UC Berkeley Bioengineering
- 2015 Mr. Colin Zamecnik, UC Berkeley Bioengineering
- 2015 Mr. Douglas Kelkhoff, UC Berkeley Bioengineering
- 2016 Mr. Brent Kelly, UC Berkeley Mechanical Engineering
- 2016\* Mr. Jiacheng Wu, UC Berkeley Mechanical Engineering (Advisor: Shawn Shadden)
- 2016 Mr. Adam Updegrave, UC Berkeley Mechanical Engineering (Advisor: Shawn Shadden)
- 2016 Ms. Olivia Scheideler, UC Berkeley Bioengineering
- 2016 Ms. Shang-Li Wu, UC Berkeley Mechanical Engineering (Advisor: Homayoon Kazerooni)
- 2016\* Mr. Junghyun Kim, UC Berkeley Mechanical Engineering (Advisor: Lydia Sohn)
- 2016 Ms. Nahyun Cho, UC Berkeley Chemical and Biomolecular Engineering (Advisor: Lydia Sohn)
- 2016 Ms. Saghil Sadoughi, UC Berkeley Mechanical Engineering (Advisor: Tony Keaveny)
- 2016 Mr. Nicholas Errico, UC Berkeley Mechanical Engineering (Advisor: Homayoon Kazerooni)
- 2016 Ms. Courtney Mazur, UC Berkeley Bioengineering (Advisor: Tamara Alliston, UCSF)
- 2017 Mr. Logan Van Engelhoven, UC Berkeley Mechanical Engineering (Advisor: Homayoon Kazerooni)
- 2017 Mr. Seyed Mirramezani, UC Berkeley Bioengineering (Advisor: Shawn Shadden)
- 2017\* Mr. Devante Horne, UC Berkeley Bioengineering (Advisor: Jeffery Lotz, UCSF)
- 2017\* Ms. Sarah Frank, UC Berkeley Mechanical Engineering (Advisor: Shawn Shadden)
- 2017\* Mr. Noah Bonnheim, UC Berkeley Mechanical Engineering (Advisor: Lisa Pruitt & Tony Keaveny)
- 2017 Mr. Hossein Heidari, UC Berkeley Mechanical Engineering (Advisor: Shawn Shadden)
- 2018 Mr. Nathan Poon, UC Berkeley Mechanical Engineering (Advisor: Homayoon Kazerooni)
- 2018 Mr. Jeffery Pyne, UC Berkeley Mechanical Engineering (Advisor: Shawn Shadden)
- 2018 Mr. Miguel Rodriguez, UC Berkeley Mechanical Engineering (Advisor: Shawn Shadden)
- 2018 Mr. Shengxi Wang, UC Berkeley Mechanical Engineering (Advisor: Kyriakos Komvopoulos)

**MASTER’S THESIS ADVISOR** (\* indicates committee chair)

- 2013 Ms. Cynthia Cruz, Mechanical Engineering, “*Compression Testing of Ultra-High Molecular Weight Polyethylene Blended and Diffused with Vitamin E*”
- 2013 Ms. Rebecca Usoff, Mechanical Engineering, “*The Importance of Retrievals in Implant Design: Case Study of a Broken Intramedullary Nail*”
- 2014 Mr. Alexander Baker, Mechanical Engineering, “*Finite Element Analysis of an Individual Trabecula in Bending: a Parameter Study*”
- 2014 Ms. Megan Pendleton, Mechanical Engineering, “*Design of Three Point Bending Experimental System for Individual Trabecula*”

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|-------|---|
| 2014  | Mr. Louis Malito, Mechanical Engineering, “Bearing Surface Damage Analysis of Total Shoulder Replacement Retrievals With Varying Fixation Designs”  |
| 2015  | Mr. Jacob Wolf, Mechanical Engineering, “Validation and Improvements to Ultrasound-Based Flow Diagnostics for the Human Left Ventricle”             |
| 2015  | Mr. Adam Updegrave, Mechanical Engineering, “Integration of Open Source Meshing and Solid Model Techniques into Simvascular 2.0”                    |
| 2015* | Ms. Audrey Ford, Mechanical Engineering, UC Berkeley Graduate Fellow, “Development of Modular Engineered Tissue Surfaces for Cartilage Repair”      |
| 2016  | Ms. Sarah Frank, Mechanical Engineering, “Color Doppler Ultrasound Velocity Field Reconstruction: Accounting for Through-Plane Divergence”          |
| 2016  | Mr. Joseph Marquis, Mechanical Engineering 5 <sup>th</sup> Year Master’s Program  |
| 2016  | Mr. Miguel Rodriguez, Mechanical Engineering, “A Pythonic Computational Tool for Continuum Mechanics Problems”                                      |
| 2016  | Mr. Ryan O’Sullivan, Mechanical Engineering, “The Effect Of Seatback Angle And Seatbelt Position On Safety Metrics In A Frontal Crash”              |
| 2016  | Mr. Aaron Jameson, Mechanical Engineering, “Effect of Muscle Activation on Neck Kinematics During a Rear Impact”                                    |
| 2017* | Mr. Minhao Zhou, Mechanical Engineering 5 <sup>th</sup> Year Master’s Program   |
| 2017  | Mr. Erwin Sutino, Mechanical Engineering 5 <sup>th</sup> Year Master’s Program  |
| 2017  | Ms. Aimee Goncalves, Mechanical Engineering, “Modular Stewart Platform for Surgical Simulation Testbed”   |
| 2017* | Mr. Thomas Georgiou, Mechanical Engineering, “Soft-Tissue Mechanical Tester”  |
| 2017* | Mr. Semih Bezci, Mechanical Engineering, “Effects of Axial Compression and Rotation Angle on Intervertebral Disc Mechanics in Torsion”              |
| 2017* | Ms. Shannon Emerzian, Mechanical Engineering, (co-chair with Professor Tony Keaveny), “Effect of <i>ex vivo</i> Ionizing Radiation on Bone Quality” |
| 2018* | Mr. Benjamin Werbner, Mechanical Engineering  |
| 2018  | Ms. Xiaolin (Angela) Zhu, Mechanical Engineering  |
| 2018* | Mr. Gabriel Lopez, Mechanical Engineering   |

## ME192 - MASTER’S CAPSTONE PROJECTS

2016-2017 (6 projects, 14 students)

**Brilk (industry collaborator)** – Prevention of breast-feeding cessation.

Ms. Nicci Cazares, Mechanical Engineering (*Position after lab*: Mechanical Engineer at PCH Lab, San Francisco, CA)

Ms. Haohan Gong, Bioengineering

Ms. Maya Mason, Bioengineering (*Position after lab*: Associate Consultant at Beghou Consulting, Emeryville, CA)

**Cenoflex** – Treatment for lymphodema

Mr. Jacob Rubrecht, Bioengineering (*Position after lab*: R&D Engineer at VytronUS, Sunnyvale, CA)

**Clean Ear Bottle** – Improving ear canal drug delivery

Mr. Chai Chur Err, Mechanical Engineering (*Position after lab*: Civil Aviation Authority in Singapore)

Mr. Michael Lee, Mechanical Engineering (*Position after lab*: Mechanical Engineer at Alloy Product Development, San Francisco, CA)

Mr. Michael Singer, Mechanical Engineering

**TheraNova** – Improved egg retrieval.

Ms. Nupur Kaku, Bioengineering

Ms. Brooke Lohman, Bioengineering

Mr. Jorge Ruiz, Mechanical Engineering (*Position after lab*: Design Release Engineer at General Motors)

**Penumbra/UCSF** – Developing MRI safe catheters.

Ms. Vyshaali Jagadeesan, Bioengineering

Mr. Srivishnu Koganti, Bioengineering

Mr. Taylor Shen, Bioengineering

**Zenflow** – Developing better treatment options for enlarged prostates.

Ms. Viola Quach, Bioengineering

MEng 2<sup>nd</sup> faculty reader

**Cryoprinting for Tissue Engineering** (1<sup>st</sup> Reader: Prof. Boris Rubinsky)

Mr. Nuocheng (Bobo) Xia, Mechanical Engineering

Mr. Tanner Barnes, Mechanical Engineering

Mr. Ben Laures, Mechanical Engineering

Ms. Ariel Ya Wen, Mechanical Engineering

2017-2018 (3 projects, 14 students)

**Biological Hip Replacement** – Industry Mentor: Dr. Amir Jamali

Stephen Muller, Bioengineering

Karl Engel, Bioengineering

Vija Veinbergs, Bioengineering

Alejandra Pacheco, Bioengineering

**Device for Early Onset Scoliosis** – Industry Mentor: Matthew Thompson, Green Sun Medical

Caitlin Dorff, Bioengineering

Joseph Felipe, Mechanical Engineering

Kexin Xu, Bioengineering

Erin Gudger, Bioengineering

**Million Hands** – co-Faculty Advisor: Prof. Alice Agogino

Aashish Bhardwaj, Bioengineering

Sina Dabiri, Bioengineering

Annie Lee, Mechanical Engineering

Jacqueline Nguyen, Mechanical Engineering

Jose Ramirez, Bioengineering

Aastha Shah, Bioengineering

**UNDERGRADUATE CAPSTONE ADVISOR**

2018

**SWE National Team Tech Program (role: advisor, sponsored by Boeing)** – CAL SWE Team Tech is tasked with (1) determining what could be done to reduce the incidence of bone implant failures from a mechanical design standpoint (implant geometry, materials, etc.) and (2) determining how to monitor real-time biological response or implant performance during the healing time frame.

2016

**UCSF (industry collaborator)** – Redesigning PCA devices to treat pain with music in addition to pain medication.

Mr. Jiayang Cao, Senior - Mechanical Engineering

Ms. Tatiana Jansen, Junior - Bioengineering

Ms. Joyce Huang, Senior – Mechanical Engineering

Mr. Rohan Konnur, Sophomore – Electrical Engineering and Computer Science

## **PROFESSIONAL ACTIVITIES**

- May 2010      Invited Participant at the NIBIB Training Grantees Meeting (NIH Bethesda, MD)
- Sept 2011      Invited Participant at an NSF Advance Workshop
- 2011-2014      Co-chair at the annual meeting of the Biomedical Engineering Society (Section: Mechanotransduction & Mechanobiology, Hartford, CT 2012; Musculoskeletal Tissue Engineering I - Biomechanics and Tissue Repair, Seattle, WA 2013; Translational Research Relevant to Common Orthopaedic Injuries, San Antonio, TX 2014)
- 2014 - present      Biomechanics consultant, Cellider Biotech, Zaragoza, Spain
- Apr. 2014      Ad-hoc reviewer of research proposals for the Technology Foundation STW (a Dutch funding agency for academic research in the field of applied sciences)
- 2014 - present      Ad-hoc Panelist for National Science Foundation - Biomechanics and Mechanobiology (NSF - BMMB) Program
- July 2014      Panelist for Life in Academia program at the 7<sup>th</sup> World Biomechanics Congress (ASME Summer Bioengineering Conference, Boston, MA 2014)
- 2015 - present      Panelist for NSF Graduate Researcher Fellowship Program (served 2015 and 2018)
- Jan. 2015      Selected Participant in 2015 National Effective Teaching Institute (NETI, Austin, TX)
- Sept. 2015      Selected Participant in 2015 US Frontiers of Engineering Symposium by the National Academy of Engineering of the National Academies (Irvine, CA)
- 2015      Tissue engineering and biomechanics consultant, Aleeva Medical, San Jose, CA
- Apr. 2016      Invited Participant in 2016 National Academies of Science (NAS), Engineering and Medicine's symposium (Keck Center, Washington DC)
- May 2016      Co-Organizer of Women in ISSLS (International Society for the Study of the Lumbar Spine) workshop at the Spine Week meeting (Singapore).
- June 2016      Selected Participant (by Dean Sastry of UCB COE) for the 2016 Denise Denton Emerging Leaders Workshop (Madison, WI).
- June 2016      Reviewer for National Institutes of Health Study Section
- July 2016      Participant in 7<sup>th</sup> Annual Summer School on Biomechanics of Soft Tissues (Graz, Austria)
- Sept. 2016      Invited Faculty Participant at 2016 Symposium: 21st Century Mindsets & Strategies for Career Advancement, part of NSF Minority Faculty Development Workshop (MFDW) (Berkeley, CA)
- Feb 2017      Invited Participant, UC Berkeley – World Economic Forum conference for Science, Technology, and Health (Berkeley, CA)
- Feb 2017      Invited Panelist, Level Playing Field Institute & Upward Bound Math and Science Program (Kapor Center for Social Impact, Oakland, CA)
- June 2017      Co-Organizer of scientific workshop at the Annual Summer Biomechanics, Bioengineering, and Biotransport (SB3C) titled “Additive Manufacturing and Biofabrication in Mechanobiology” (Tucson, AZ)
- June 2017      Co-Chair at the annual Summer Bioengineering, Biomechanics, and Biotransport (SB3C) Conference (Tucson, AZ)



Sept. 2017 Invited Faculty Participant at 2017 Symposium: Engineering a World of Difference: Academic-Industry Connections, part of NSF Minority Faculty Development Workshop (MFDW) (Houston, TX)

Sept. 2017 Invited Faculty Panelist for NextProf Workshop, University of Michigan, Ann Arbor, MI

Oct. 2017 Reviewer for Stryker ORS Women's Fellowship

Mar. 2018 Reviewer for ORS Spine Section Poster Award

June 2018 Co-Chair at the 8<sup>th</sup> World Congress of Biomechanics, Dublin, Ireland

### Memberships

2010 – 2013 New York Academy of Sciences (NYAS)

2010 – 2014 American Association for the Advancement of Science (AAAS)

2010 – Present Orthopaedic Research Society (ORS)

2010 – Present American Society of Mechanical Engineers (ASME)

2011 – Present Biomedical Engineering Society (BMES),

2013 – Present Society of Women Engineers – Professional division (SWE; 2013-2014: UC Berkeley Liaison, 2015-present: Scholarship Chair)

2013 – Present National Society of Black Engineers (NSBE; Professional Member)

2016 – Present International Society for the Study of the Lumbar Spine (ISSLS)

## **REVIEWER**

### Journals

Journal of Tissue Engineering and Regenerative Medicine; Spine; PLoS One Journal; Journal of Cellular Physiology; Transactions on Biomedical Engineering; Annals of Biomedical Engineering; Journal of Engineering in Medicine; Acta Biomaterialia; Biomechanics and Modeling in Mechanobiology; Journal of Biomechanics; European Spine Journal; ASME Journal of Biomechanical Engineering; Tissue Engineering: Part A and B; Journal of Orthopaedic Research

### Funding Agencies (ad-hoc)

National Science Foundation Graduate Research Fellowship Program (2015); National Science Foundation Biomechanics and Mechanobiology (BMMB) Program (2014-2015); National Science Foundation East Asia Pacific Summer Institutes (NSF-EAPSI; 2007-2015)

### Conferences

Annual Summer Bioengineering Conference (abstract reviewer, session co-chair, and workshop organizer; 2015 – present); BioMedical Engineering Society (BMES) Annual Meeting (abstract reviewer and session co-chair; 2013 – present); Society for Biomaterials Annual Meeting (abstract reviewer; 2012 – 2013); Annual Orthopaedic Research Society Meeting (abstract reviewer and session co-chair; 2012 – present); Annual Summer Bioengineering American Society of Mechanical Engineers (ASME) Conference (abstract reviewer; 2011 – 2014)

### Other

Springer Science - Book Chapter Review – Structural Interfaces and Attachments in Biology (2012); Technology Foundation STW – Dutch Funding Agency Ad-hoc grant reviewer (2014-2015)

## **DEPARTMENTAL, COLLEGE, & UNIVERSITY SERVICE**

### Departmental

07/2013 – 12/2015 Member, Committee on Safety

07/2014 – 06/2016 Member, Committee on Student Prizes

07/2014 – 12/2016 Member, Committee on Undergraduate Admissions

07/2014 – 12/2016 Member, Committee on Equity, Diversity & Inclusion

07/2014 – 12/2016 Member, Committee on Courses  
 03/2017 – present Member, Conflict of Interest Committee for Lydia Sohn  
 07/2017 – present Member, Committee on ABET & Undergraduate Study  
 07/2017 – present Member, Committee on Undergraduate Admissions  
 07/2017 – present Member, Committee on Equity, Diversity & Inclusion  
 10/2017 – 05/2018 Member, ME search committee for tenure-track faculty position

#### College

07/2014 – 2015 Member, Computing and Computer Science Education Committee  
 11/2017 – Present Reviewer & Interviewer, Berkeley Management, Entrepreneurship & Technology (MET) Program  
 02/2018 – Present Member, Advancing Faculty Diversity in Berkeley Engineering

#### University

07/2013 – present Mentor, Faculty Mentor to 6 Regents' and Chancellor's (RC) and Cal Opportunity (CalOp) Scholars  
 07/2014 – present Member, Committee for the 2014 Summer Undergraduate Research Fellows (SURF) program  
 07/2015 – present Member, Hitchcock Committee  
 12/2016 – present Faculty Interviewer, Regents' and Chancellor's Scholarship, Academic Senate Committee on Undergraduate Scholarships, Honors, and Financial Aid

### **TEACHING AND INSTRUCTION**

2013 Developer, ME210/BioE209 “Advanced Orthopaedic Biomechanics”  
 2013 Instructor, ME176/BioE119 “Orthopaedic Biomechanics” (27 student)  
 2014 – present Instructor, E7 “Introduction to Computer Programming for Scientist and Engineers” (200-230 students)  
 2015 – present Instructor, ME214/BioE214 “Advanced Tissue Mechanics” (10-25 students)  
 2016 – present Faculty Advisor, ME199 QB3 Independent Research Project (with UCSF and industry)  
 2016 – present Instructor & Developer, ME178/BioE137 “Designing for the Human Body” (20-25 students)  
 2016 – present Instructor, ME108 “Mechanical Behavior of Engineering Materials” (125 students)  
 2017 – present Instructor & Developer, ME278/BioE237 “Designing for the Human Body” (5-10 students, room share with ME178/BioE137)  
 2018 – present Instructor & co-Developer (with Professor Lydia Sohn, Mechanical Engineering), ME192 “industry-Associate Capstones in Mechanical Engineering” (~20 students)

#### Independent Research Projects

Spring 2016 Texas Innovation Challenge: North America Design Contest 2016 (Faculty Advisor)  
 Spring 2016 *Clean Ear Bottle* (Faculty Advisors: Grace O'Connell (primary) and Sara Beckman; Industry mentors: Marymoore Patterson; Clinical sponsor: Jill Davis and Andrew Goldberg) – *continued as a MEng Capstone Project for the 2016-2017 academic year.*  
 Spring 2016 *Patient-Controlled Analgesia (PCA) Project* (Faculty Advisors: Grace O'Connell (primary) and Sara Beckman; Industry mentors: Marymoore Patterson; Clinical sponsor: Ben Alter and Walter German) – *continued as a MEng Capstone Project for the 2016-2017 academic year.*  
 Spring 2017 NASA Challenge: 3D printing for space applications (Faculty Advisor)

### **EXTERNAL ACTIVITIES AND OUTREACH**

#### Mentor/Tutor

2008 – 2009 Volunteer, Big Brothers Big Sisters Program  
 2009 – 2011 Tutor, Top Honors – Math tutoring to 6-9<sup>th</sup> graders in New York City

- 2011 – 2013 Mentor, New York Academy of Sciences (NYAS) STEM Program (Credentialed New York Academy of Sciences Education Fellows)
- 2011 Invited Postdoc Panelist, Career Development at Columbia University
- 2013 – present Faculty Advising, Undergraduate Curriculum advising in the Mechanical Engineering Department (Drop-in day and one-on-one advising)
- 2014 Invited Faculty Panelist, Career Development workshop at the 7<sup>th</sup> World Congress of Biomechanics, Boston, MA USA
- 2014 - present Organizer, Engineering in Medicine Module, Girls in Engineering (College of Engineering at UC Berkeley)
- 2014 – 2015 UC Berkeley Liaison for Society of Women Engineers – Golden Gate Section
- 2014 Faculty AMA Participant for Equity, Inclusion and Diversity in the Department of Mechanical Engineering
- 2015 – present Scholarship Committee Chair, Society of Women Engineers – Golden Gate Section
- 2015 – present Mentor, East Bay College Fund, Oakland, CA
- 2016 – present Faculty Advisor, UC Berkeley Black Engineering and Science Student Association
- 2016 – present Acting Faculty Advisor, UC Berkeley Society of Women Engineers
- 03/2016 Faculty Panelist, Career Panel in First Annual Berkeley Engineering Stars in Technology (BEST) Symposium (sponsored by EECS at UC Berkeley)
- 04/2016 Faculty Panelist for Graduate Women of Engineering at UC Berkeley Life After Graduate School Panel (hosted by Sandia, Berkeley, CA)
- 04/2016 Invited Participant in 2016 UCB Society of Women Engineers New Admit Overnight Host Program Banquet (Berkeley, CA)
- 06/2016 Faculty Lead, Girls in Engineering Program (College of Engineering at UC Berkeley)

## **CURRENT AND PAST RESEARCH SUPPORT**

### Current Support

NSF BMMI

07/2018 – 06/2023

### **CAREER: Modeling the Intervertebral Disc Using Quantitative MR Imaging**

Objective: To elucidate the role of tissue hydration and swelling on load distributions throughout subcomponents of the intervertebral disc. We will use quantitative MR to noninvasively determine tissue composition and correlate MR parameters with tissue- and joint-level mechanics. Then, we will evaluate time-dependent changes in tissue composition and mechanics using a compression-based bioreactor.

Role: PI

France-Berkeley Fund

07/2016 – 06/2018

### **Modular Tissue Engineering for Tracheal Reconstruction**

Objective: To use modular tissue engineering developed for articular cartilage regeneration for tracheal reconstruction. This seed project is a collaborative effort between Drs. Frédéric Kolb at the Institut Gustave Roussy in France and Grace O'Connell at the University of California, Berkeley.

Role: PI

Grainger Foundation Frontiers of Engineering Grants

07/2016 – 06/2018

### **Biocompatibility and bioprinting of soft materials for tissue engineering**

Objective: To evaluate soft polymers with shear thinning properties for three-dimensional (3D) printing and mechanical and swelling properties comparable to native intervertebral disc tissues for tissue engineering. This project is a collaborative effort between Drs. Jeannette Garcia at IBM and Grace O'Connell at the University of California, Berkeley.

Role: PI

Gift from Berkeley Alum

07/2017

A generous donation from Dennis Chan, UC Berkeley Alum, was provided in support of project-based courses (ME178) and for the Million Hands project in collaboration with Prof. Alice Agogino.

Role: Faculty Facilitator

UC Berkeley Chancellor's Community Partnership Fund 07/2017 – 06/2018

**Tutoring Support for Low Income, Students of Color**

Objective: to develop tutoring support for low income students of color through the Black Engineers and Scientist Student Association (BESSA).

Role: Faculty Sponsor

Arthritis National Research Foundation 07/2017 – 06/2018

**Predicting tissue growth potential using high-throughput screening for cell mechanics**

Objective: to develop a novel high-throughput approach for determining tissue-growth potential of cell populations for cartilage tissue engineering.

Role: PI

Signatures Innovator Award 07/2017 – 06/2019

**Innovating diagnostics and treatment planning for lower back pain**

Objective: To transform software written for research purposes into stand-alone software with commercialization potential for lower back pain treatment or diagnostics.

Role: PI

CITRIS Seed Funding Program 07/2017 – 06/2018

**Million Hands: Prosthetic Hands for Children through an Open Source Platform, 3D Printers and Sensors**

Objective: In this collaborative proposal between researchers from UC Berkeley and UC Davis, we will develop a modular platform that is 1) customizable to the many hand shapes that are possible as a result of the above conditions, 2) capable of natural movement, and 3) strong enough to perform most daily tasks.

Role: PI

Previous Support

NIH NIAMS F31 Predoctoral Fellowship (PI: O'Connell) 06/2008 – 10/2009

**Structural and Tissue Mechanics of Normal and Degenerate Intervertebral Disc**

Objective: To noninvasively determine intradiscal deformations of healthy and degenerated intervertebral discs. Following joint level mechanics, tissue-level mechanics were determined through biaxial testing of the annulus fibrosus, which was used to develop and validate a constitutive relationship of healthy and degenerated disc tissue.

Role: PI; Mentor: Dr. Dawn M. Elliott, PhD

UC Berkeley, Junior Faculty Research Award 04/2014 – 08/2015

**Effect of injury on joint mechanical function with diurnal loading conditions**

Objective: This objective of this equipment research grant was to develop a bioreactor for full bone-disc-bone motion segments. The developed bioreactor can maintain intervertebral disc organ culture.

Role: PI

Rose Hill Innovator Award 05/2014 – 12/2017

**Personalized Healthcare: Developing large-scale engineered cartilage surfaces**

Objective: To use a novel technique for developing large-scale engineered cartilage surfaces. Fractal fabrication and high-resolution imaging techniques will be used to develop patient specific surface contours.

Role: PI

Hellman Fellows Fund

07/2015 – 06/2016

**Effect of disc herniation repair on tissue remodeling and joint function**

Objective: To use tissue engineering and regenerative medicine techniques to develop engineered nucleus pulposus tissues with swelling capabilities and mechanical properties of healthy nondegenerated tissues.

Role: PI