

## Adam Jeffrey Engler, PhD

Shu Chien-Gen Lay Department of Bioengineering  
 Sanford Consortium for Regenerative Medicine, Rm 2005  
 University of California, San Diego  
 2880 Torrey Pines Scenic Drive  
 La Jolla, CA 92037

Office: (858) 246-0678  
[aengler@ucsd.edu](mailto:aengler@ucsd.edu)  
<http://ecm.ucsd.edu/>  
 twitter: @AdamEnglerUCSD

### ACADEMIC APPOINTMENTS AND AFFILIATIONS

#### **University of California, San Diego; La Jolla, CA**

<i>Professor</i> , Chien-Lay Department of Bioengineering	2018 – present
<i>Chair</i> , Chien-Lay Department of Bioengineering	2022 – present
<i>Vice Chair</i> , Department of Bioengineering	2018 – 2021
<i>Associate Director</i> , Medical-Scientist Training Program	2017 – 2022
<i>Member</i> , UCSD Moores Cancer Center	2016 – present
<i>Associate Professor</i> , Department of Bioengineering	2014 – 2018
<i>Resident Scientist</i> , Sanford Consortium for Regenerative Medicine	2012 – present
<i>Member</i> , Material Science Graduate Program	2009 – present
<i>Member</i> , Biomedical Sciences Graduate Program	2009 – present
<i>Member</i> , UCSD Stem Cell Institute	2009 – present
<i>Member</i> , UCSD Glycobiology Research and Training Center	2009 – present
<i>Assistant Professor</i> , Department of Bioengineering	2008 – present

### EDUCATION AND RESEARCH TRAINING

Postdoctoral	<b>Princeton University</b> ; Princeton, NJ	2006 - 2008
Fellowship	<i>Dept. of Molecular Biology</i> Research Area: Fibronectin's influence on embryonic stem cells and cell adhesion Advisor: Jean E. Schwarzbauer, Ph.D.	
Ph.D.	<b>University of Pennsylvania</b> ; Philadelphia, PA <i>Biophysical Engineering Lab</i> Dissertation Title: Mechanochemical Signaling Directs Cell State: A Mechanics of Materials Foundation for Cell Biology Advisor: Dennis E. Discher, Ph.D.	2006
B.S.E.	<b>University of Pennsylvania</b> ; Philadelphia, PA Major: Bioengineering      Minor: Mathematics	2002

### HONORS AND FELLOWSHIPS

- Mid-Career Award, Biomedical Engineering Society (2023)
- Fellow, Biomedical Engineering Society (2021)
- Curtis W. McGraw Research Award, American Society for Engineering Education Engineering Research Council (2018)
- Fellow, American Institute of Medical and Biological Engineering (2018)
- Frontiers of Engineering Symposium Attendee, National Academy of Engineering (2015)
- Y.C. Fung Young Investigator Award, American Society for Mechanical Engineering (2015)
- Renato Iozzo Mid-career Award, American Society for Matrix Biology (2014)
- Breast Cancer IDEA Award, US Dept. of Defense (2013)

- Young Investigator Award, Human Frontiers Science Program (2010)
- New Innovator Award, National Institutes of Health (2009)
- Rita Schaffer Young Investigator Award, Biomedical Engineering Society (2008)
- Rupert Timpl Award, International Society for Matrix Biology (2008)
- National Research Service Award, National Cancer Institute/Princeton (2006-2008)
- John A. Goff Prize, University of Pennsylvania (2006)
- Graduate Research Symposium Award, University of Pennsylvania (2006)
- Graduate Student Award, International Society of Biorheology (2005)
- Graduate Student Award, Biomedical Engineering Society (2004)
- Ashton Foundation Predoctoral Fellowship (2002-2006)
- National Science Foundation - REU Fellowship (2001)

### **PROFESSIONAL SOCIETY MEMBERSHIPS**

- American Heart Association (AHA) (2012-present)
- American Society for Cell Biology (ASCB) (2002-present)
- American Society for Matrix Biology (ASMB) (2008-present)
- American Society for Mechanical Engineering (ASME) (2002-2007, 2010-2017)
- Biomedical Engineering Society (BMES) (2002-present)
- Biophysical Society (2002-present)
- International Society for Stem Cell Research (ISSCR) (2008-2017)
- Tissue Engineering and Regenerative Medicine International Society (2009-2021)

## **PUBLICATIONS**

### **REFEREED JOURNAL PUBLICATIONS (Google Scholar: 36,000+ citations; H-index = 58; i10-index = 101)**

1. Gonzalez, G., Nelson, A.C, Holman, A.R., Whitehead, A.J., LaMontagne, E., Lian, R., Vatsyayan, R., Dayeh, S.A., and Engler, A.J. “Conductive Electrospun Polymer Improves Stem Cell-Derived Cardiomyocyte Function and Maturation.” (submitted)
2. Whitehead, A., Atcha, H., Hocker, J., Ren, B., and Engler, A.J. “Modulation of Cardiac Fibroblast Stress Responses through an AP-1-NFκB-GATA5 Signaling Axis” (submitted)
3. Kane, M., Birmingham, K.G., Yeoman, B., Beri, P., Tuler, J., Williams, I.L., Kumar, A., Klein, S., Katira, P., and Engler, A.J. “Stromal Cell Adhesion Predicts Severity of Metastatic Disease” (submitted)
4. Chrysovergi, M-A., Al-Hilal, T., Grasberger, P.E., Liu, F., Auernheimer, V., Zhou, Y., Santos, A., Ganzleben, I., Ligorio, M., Sicard, D., Probst, C.K., Vrbanac, V., Rahimi, RA., Warner, R.D., Reddi, T.S., Vincent, L., Happe, C.L., Chaum, E., Yates, C.R., Daneshvar, K., Mullen, A.C., Ting, D., White, E.S., Kalluri, R., Miller, M.A., Goldmann, W.H. Mempel, T.R, Alonso, J.L., Tager, A.M., Engler, A.J., Tschumperlin, D.J., and Lagares, D. “Durotaxis is a driver and therapeutic target in organ fibrosis and metastatic cancer” (submitted)
5. Ruoss, S., Nasamran, C.A., Ball, S.T., Dorn, S.N., Walker, J.T., Ahmed, S.S., Parekh, J.N., Fisch, K.M. Engler, A.J., and Ward, S.R. “The heterogeneity of bone marrow mesenchymal stromal cells in mouse is not present in clinical cell preparations” (submitted)

6. Wu, Z., Su, J., Li, F., Chen, T., Mayner, J., Engler, A.J., Li, Q., Guan, K.-L. “RB1 loss silences YAP expression to promote small cell lung cancer metastasis” (submitted)
7. Molley, T. and Engler, A.J. “Using Biophysical Cues and Biomaterials to Improve Genetic Models” (submitted)
8. Birker, K., Ge, S., Kirkland, N.J., Theis, J.L., Marchant, J., Fogarty, Z.C., Missinato, M.A., Kalvakuri, S., Grossfeld, P., Engler, A.J., Ocorr, K., Nelson, T.J., Colas, A.R., Olson, T.M., Vogler, G., and Bodmer, R. “Mitochondrial MICOS complex genes, implicated in hypoplastic left heart syndrome, maintain cardiac contractility and actomyosin integrity” *eLife*, 2023. 12: e83385.
9. Moon, S.Y., de Campos, P.S., Matte, B.F., Placone, J.K., Zanella, V.G., Martins, M.D., Lamers, M.L., and Engler, A.J. “Cell contractility drives mechanical memory of oral squamous cell carcinoma” *Mol Bio Cell*, 2023. 34(9): ar89.
10. Mayner, J.M., Masutani, E.M., Demeester, E., Kumar, A., Macapugay, G., Beri, P., Lo Sardo, V., and Engler, A.J. “Heterogeneous Expression of Alternatively Spliced lncRNA mediates Vascular Smooth Cell Plasticity” *Proc Nat Acad Sci*, 2023. 120(24): e2217122120.
11. Atcha, H. Choi, Y.S., Chaudhuri, O., and Engler, A.J. “Getting Physical: Material Mechanics is an Intrinsic Cell Cue” *Cell Stem Cell*, 2023. 30(6):750-765.
12. Kirkland, N.J., Skalak, S., Whitehead, A.J., Hocker, J.D., Beri, P., Vogler, G., Hum, B., Wang, M., Lakatta, E.G., Ren, B., Bodmer, R., and Engler, A.J. “Age-dependent Lamin remodeling induces cardiac dysfunction via dysregulation of cardiac transcriptional programs” *Nature Aging*, 2023. 3(1): 17-33.
13. LaMontagne, E. Muotri, A.R., and Engler, A.J. “Recent advancements and future requirements in vascularization of cortical organoids” *Frontiers Bioeng Biotechnol.*, 2022. 10: 1048731.
14. Ruoss, S., Esparza, M.C., Vasquez-Bolanos, L.S., Nasamran, C.A., Fisch, K.M., Engler, A.J., and Ward, S.R. “Spatial transcriptomics to explore regional differences within pathological muscle tissue in the pre-clinical rabbit model of rotator cuff tear” *J Ortho Surg Res.*, 2022. 17(1), pg 1-10.
15. Meng, Z.\* , Li, F.-L.\* , Fang, C., Yeoman, B., Qiu, Y., Wang, Y., Cai, X., Lin, K.C., Yang, D., Luo, M., Fu, V., Ma, X., Diao, Y., Giancotti, F.G., Ren, B., Engler, A.J., Guan, K.-L. “The Hippo Pathway Mediates Semaphorin Signaling” *Science Adv.*, 2022. 8(3): eabl9806. \*co-first authors
16. Powers, J.D., Kirkland, N.J., Liu, C., Razu, S., Fang, X., Engler, A.J., Chen, J., McCulloch, A.D. “Subcellular remodeling in filamin C deficient mouse hearts impairs myocyte tension development during progression of dilated cardiomyopathy” *Int. J. Mol Sci.*, 2022. 23(2): 871.

17. Gonzalez, G., Holman, A.R., Nelson, A.C., and Engler, A.J. “Engineering the Niche to Differentiate and Deploy Cardiovascular Cells.” *Curr Op Biotechnol.*, 2022. Vol 74, April 2022, Pages 122-128
18. Whitehead, A.J., Hocker, J.D., Bing Ren, B., Engler, A.J. “Improved epicardial cardiac fibroblast generation from iPSCs.” *J Mol. Cell Cardiology*, 2022. 164: 58-68.
19. Ruoss, S., Ball, S.T., Dorn, S.N., Parekh, J.N., Whitehead, A, Engler, A.J., Ward, S.R. “Acetabular bone marrow aspiration during total hip arthroplasty.” *J Am Acad Orthop Surg.*, 2021. 29(16): e815-e819.
20. Teng, E.L., Masutani, E.M., Fung, J., Lian, R., Ngo, B., Kumar, A., Placone, J.K., Lo Sardo, V. and Engler, A.J. “High Shear Stress enhances Endothelial Permeability in the presence of the Risk Haplotype at 9p21.3.” *APL Bioengineering*, 2021. 5(3): 036102.
21. Whitehead, A.J. and Engler, A.J. “Regenerative cross talk between cardiac cells and macrophages.” *Am J Physiol - Heart Circ Physiol*, 2021. 320(6): H2211-H2221.
22. Yeoman, B., Shatkin, G., Beri, P., Katira, P.,\* and Engler, A.J.,\* “Escaping the Stiffness Trap: Adhesion Strength and Contractility Enable Metastatic Cells to become Adurotactic” *Cell Reports*, 2021. 34(10): 108816. \*co-corresponding author
23. Banisadr, A., Eick, M., Beri, P., Parisian, A.D., Yeoman, B., Placone, J.K., Engler, A.J.,\* and Furnari, F.\* “EGFRvIII uses Intrinsic and Extrinsic Mechanisms to Reduce Glioma Adhesion and Increase Migration” *J Cell Sci*, 2020. 133(24): jcs247189. \*co-senior authors
24. Shatkin, G., Yeoman, B., Birmingham, K., Katira, P., and Engler, A.J. “Computational Models of Migration Modes Improve our Understanding of Metastasis” *APL Bioengineering*, 2020. 4: 041505.
25. Fattet, L., Jung, H.-Y., Matsumoto, M., Aubol, B.E., Kumar, A., Adams, J.A., Chen, A.C., Sah, R.L., Engler, A.J., Pasquale, E.B., and Yang, J. “Matrix rigidity controls epithelial mesenchymal-plasticity and tumor metastasis via a mechanoresponsive EPHA2/LYN complex.” *Dev. Cell*, 2020. 54(3):302-316.e7.
26. Meckelmann, S.W. , Hawksworth, J.I., White, D., Andrews, R., Rodrigues, P., O’Connor, A., Alvarez-Jarreta, J., Tyrrell, V.J., Hinz, C., Zhou, Y., Williams, J., Aldrovandi, M., Watkins, W.J., Engler, A.J., Lo Sardo, V., Slatter, D.A., Allen, S.M., Acharya, J., Mitchell, J., Cooper, J., Aoki, J., Kano, K., Humphries, S.E., O’Donnell, V.B. “Metabolic dysregulation of the lysophospholipid/autotaxin axis in the chromosome 9p21 gene SNP rs10757274.” *Circulation: Genomic Prec. Med.*, 2020. 13(3): e002806.
27. Plunkett, C.M.,\* Kumar, A.,\* Yrastorza, J., Hou, Y.-H., Placone, J.K., Grennan, G., and Engler, A.J. “H-Ras Transformation of Mammary Epithelial Cells Induces ERKMediated Invasion on Low Stiffness Matrix” *Adv Healthcare Mat*, 2020. 9(8): e1901366 \*co-first authors

28. Huang, N.F., Chaudhuri, O., Cahan, P., Wang, A., Engler, A.J., Wang, P., Kumar, S., Khademhosseini, A., and Li, S. “Multi-Scale Cellular Engineering: From Molecules to Organ-on-a-Chip” *APL Bioeng*, 2020. 4(1): 010906.
29. Beri, P., Popravko, A., Yeoman, B., Kumar, A., Chen, K., Hodzic, E., Chiang, A., Banisadr, A., Placone, J.K., Carter, H., Fraley, S.I., and Engler, A.J. “Cell adhesiveness serves as a biophysical marker for metastatic potential” *Cancer Res*, 2020. 80(4): 901-911.
30. Wong, L., Kumar, A., Gabela-Zuniga, B., Chua, J., Singh, G., Happe, C.L., Engler, A.J., Fan, Y., and McCloskey, K.E. “Substrate Stiffness Directs Diverging Vascular Fates” *Acta Biomater.*, 2019. 96: 321-329.
31. Velez, D.O., Ranamukhaarachchi, S.K., Modi, R.N., Kumar, A., Lim, E.W. Engler, A.J., Metallo, C.M., and Fraley, S.I. “3D collagen architecture regulates cell adhesion through degradability, thereby controlling metabolic and oxidative stress” *Integr. Biol.*, 2019. 11(5): 221-234.
32. Teng, E.L., and Engler, A.J. “Mechanical influences on Cardiovascular Differentiation and Disease Modeling” *Exp Cell Res*, 2019. 377(1-2): 103-108.
33. Odeck, M.G.,\* Kumar, A.,\* Placone, J. K.,\* Plunkett, C.M., Matte, B.F., Wong, K.C., Fattet, L., Yang, J., and Engler, A.J. “Dynamically Stiffening Niche Promote Malignant Transformation via Collective Mechanical Signaling” *Proc Nat Acad Sci*, 2019. 116(9): 3502-3507. \*co-first authors
34. Deacon, D.C.†, Happe, C.L.†, Chen, C.†, Tedeschi, N., Manso, A.M., Dalton, N.D., Peng, Q., Gu, Y., Tenerelli, K.P., Tran, V.D., Chen, J., Peterson, K.L., Schork, N.J., Adler, E.D., Engler, A.J.\*, Ross, R.S.\*, and Chi, N.C.\* “Genome-edited cardiac models reveal combinatorial genetic interactions in human cardiomyopathy” *Nature Biomed Eng*, 2019. 3(2): 147-157. †co-first authors \*co-corresponding authors
35. Kumar, A., Thomas, S.K., Wong, K.C., Lo Sardo, V., Cheah, D.S., Hou, Y.-H., Placone, J.K., Tenerelli, K.P., Ferguson, W.C., Torkamani, A., Topol, E.J., Baldwin, K.K., Engler, A.J. “Mechanical activation of non-coding-RNA-mediated regulation of disease associated phenotypes in human cardiomyocytes” *Nature Biomed Eng*, 2019. 3(2): 137– 146.
36. Ranamukhaarachchi, S, Modi, R.,N., Han, A., Velez, D.O., Kumar, A., Engler, A.J., and Fraley, S.I. “Macromolecular crowding tunes 3D collagen architecture and cell morphogenesis behaviors” *Biomaterials Science*, 2019. 7(2): 618-633.
37. Matte, B.F., Kumar, A., Placone, J.K., Zanella, V.G., Martins, M.D., Engler, A.J., and Lamers, M.L. “Matrix stiffness mechanically conditions EMT and migratory behavior of Oral Squamous Cell Carcinoma” *J Cell Sci*, 2019. 132: jcs224360.
38. Lo Sardo, V., Chubukov, P., Ferguson, W., Kumar, A., Teng, E.L., Duran, M., Zhang, L., Cost, G., Engler, A.J., Urnov, F., Topol, E.J., Torkamani, A., Baldwin, K.K. “Unveiling

the Role of the Most Impactful Cardiovascular Risk Locus Through Haplotype Editing” *Cell*, 2018. 175(7): 1796-1810.

39. Beri, P., Matte, B.F, Fattet, L., Kim, D., Yang, J., and Engler, A.J. “Biomaterials to model and measure epithelial cancers” *Nature Rev Materials*, 2018. 3, 418-430.
40. Zhou, Y., Horowitz, J.C., Naba, A., Ambalavanan, N., Atabai, K., Balestrini, J., Bitterman, P.B., Corley, R.A., Ding, B.S., Engler, A.J., Hansen, K.C., Hagood, J.S., Kheradmand, F., Lin, Q.S., Neptune, E., Niklason, L., Ortiz, L.A., Parks, W.C., Tschumperlin, D.J., White, E.S., Chapman, H.A., and Thannickal, V.J. “Extracellular matrix in lung development, homeostasis and disease.” *Matrix Biol.*, 2018. 73: 77-104.
41. Meng, Z., Qiu, Y., Lin, K-C, Kumar, A., Placone, J. K., Fang, C., Wang, K-C, Lu, S., Pan, M., Hong, A. W., Moroishi, T., Luo, M., Plouffe, S. W., Diao, Y., Ye, Z., Park, H. W. Wang, X., Yu, F-X, Chien, S., Wang, C-Y, Ren, B., Engler, A.J., and Guan, K.-L. “RAP2 Mediates Mechano-Responses of Hippo pathway” *Nature*, 2018. 560: 655-660.
42. Sessions, A.O. Min, P., Cordes, T., Weickert, B.J., Divakaruni, A.S., Murphy, A.N., Metallo, C.M., and Engler, A.J. “Preserved Cardiac Function by Vinculin Enhances Glucose Oxidation and Extends Health- and Life-span” *APL Bioengineering*, 2018. 2(3): 036101.
43. Placone, J.K. and Engler, A.J. “Recent advances in extrusion-based 3D printing for biomedical applications” *Adv. Healthcare Mater.*, 2018. 7(8): 1701161.
44. Gibbons, M.G, Singh, A., Engler, A.J., and Ward. S.R. “The Role of Mechanobiology in Progression of Rotator Cuff Muscle Atrophy and Degeneration” *J Ortho Res*, 2018. 36(2): 546-556.
45. Gibbons, M.C., Fisch, K.M., Pichika, R., Cheng, T., Engler, A.J., Schenk, S., Lane, J.G., Singh, A., Ward, S.R. “Heterogeneous muscle gene expression patterns in patients with massive rotator cuff tears” *PLOS ONE*, 2017. 13(1): e0190439.
46. Kumar, A.,<sup>†</sup> Placone, J.K.,<sup>†</sup> and Engler, A.J. “Understanding the Extracellular Forces that Determine Cell Fate and Maintenance” *Development*, 2017. 144(23): 4261-4270. <sup>†</sup>co-first authors
47. Sessions, A.O., Kaushik, G., Parker, S., Raedschelders, K., Duong, J.T., Bodmer, R., Van Eyk, J.E., and Engler, A.J. “Extracellular Matrix Downregulation in the Drosophila Heart Preserves Contractile Function and Improves Lifespan.” *Matrix Biol.*, 2017. 62(1): 1527.
48. Thomas, K.A., Gibbons, M.C., Lane, J.G., Singh, A., Ward, S.R., and Engler, A.J. “Rotator cuff tear state modulates self-renewal and differentiation capacity of skeletal muscle progenitor cells” *J Ortho Res*, 2017. 35(8): 1816-1823
49. Barker, T.H. and Engler, A.J. “The Provisional Matrix: Setting the Stage for Tissue Repair Outcomes.” *Matrix Biol.*, 2017. 60-61: 1-4.

50. Happe, C.L., Tenerelli, K.P., Gromova, A.K., Kolb, F., and Engler, A.J. “Mechanically Patterned Neuromuscular Junctions-in-a-dish Have Improved Functional Maturation” *Mol Bio Cell*, 2017. 28(14): 1950-1958.
51. Herum, K.M., Choppe, J., Kumar, A., Engler, A.J., and McCulloch, A.M. “Mechanical regulation of cardiac fibroblast pro-fibrotic phenotypes” *Mol Bio Cell*, 2017. 28(14): 1871-1882.
52. Hadden, W.J., Young, J.L., Holle, A.W., Taylor-Weiner, H., Wen, J.H., Lee, A., Spatz, J.P., Engler, A.J., and Choi, Y.S. “Tunable stiffness gradient hydrogels for stem cell mechanobiology” *Proc Nat Acad Sci*, 2017. 114(22): 5647-5652.
53. Fuhrmann, A., Banisadr, A., Beri, P., Tlsty, T.D., and Engler, A.J. “Metastatic State of Cancer Cells may be indicated by Adhesion Strength.” *Biophys J*, 2017. 112(4): 736-745.
54. Gibbons, M.C., Singh, A., Anakwenze, O., Cheng, T., Pomerantz, M.D., Schenk, S., Engler, A.J., and Ward, S.R. “Histological Assessment of Chronically Torn Human Rotator Cuff Muscle: Evidence of Degeneration, Regeneration and Remodeling” *J Bone Joint Surg Am.*, 2017. 99(3): 190-199.
55. Blice-Baum, A.C., Zambon, A.C., Kaushik, G., Viswanathan, M.C., Engler, A.J., Bodmer, R., and Cammarato, A. “Modest overexpression of *FOXO* maintains cardiac proteostasis and ameliorates age-associated functional decline” *Aging Cell*, 2017. 16(1): 93-103.
56. Gibbons, M.C., Sato, E.J., Bachasson, D., Cheng, T., Azimi, H., Schenk, S., Engler, A.J., Singh, A., Ward, S.R. “Muscle Architectural Changes After Massive Human Rotator Cuff Tear” *J Ortho Res*, 2016; 34(12): 2089-2095.
57. Holle, A.W., McIntyre, A.J., Kehe, J., Wijesekara, P., Young, J.L., Vincent, L.G., and Engler, A.J. “High content image analysis of focal adhesion-dependent mechanosensitive stem cell differentiation” *Integr. Biol.* 2016; 8, 1049–1058.
58. Sessions, A.O. and Engler, A.J. “Mechanical Regulation of Cardiac Aging in Model Systems” *Circ Res*, 2016; 18(10): 1553-62.
59. Zhang, Z.-N., Freitas, B.C., Qian, H., Lux, J., Acab, A.J., Trujillo, C., Herai, R., Nguyen Huu, V.A., Wen, J.H., Joshi-Barr, S., Karpiak, J.V, Engler, A.J., Fu, X.-D., Muotri, A.R., and Almutairi, A. “Layered hydrogels accelerate iPSC-derived neuronal maturation and reveal migration defects in Rett syndrome” *Proc Nat Acad Sci*, 2016; 113(12):3185-90.
60. Ondeck, M., and Engler, A.J. “Mechanical Characterization of a Dynamic and Tunable Methacrylated Hyaluronic Acid Hydrogel” *J Biomech Eng*, 2016; 138(2):021003021003-6.
61. Happe, C.L., and Engler, A.J. “Mechanical Forces Reshape Differentiation Cues that Guide Cardiomyogenesis” *Circ Res*, 2016. 118(2): 296-310.

62. Wen, J.H., Choi, O., Taylor-Weiner, H., Fuhrmann, A., Karpiak, J.V. Almutairi, A., and Engler, A.J. “Haptotaxis is cell type specific and limited by substrate adhesiveness.” *Cell Mol Bioeng*, 2015. 8(4): 530-542.
63. Meyer, G.A., Gibbons, M., Sato, E., Lane, J.G., Ward, S.R., and Engler, A.J. “Epimuscular Fat in the Human Rotator Cuff is a Novel Beige Depot” *Stem Cells Trans Med*, 2015. 4(7): 764-74.
64. Wu, H., Lee, J., Vincent, L.G., Wang, Q., Gu, M., Lan, F., Churko, J.M., Sallam, K.I., Matsa, E., Sharma, A., Gold, J.D., Engler, A.J., Xiang, Y.K., Bers, D.M., and Wu, J.C. “Epigenetic Regulation of Phosphodiesterases 2A and 3A Underlies Compromised  $\beta$ Adrenergic Signaling in an iPSC Model of Dilated Cardiomyopathy” *Cell Stem Cells*, 2015. 7(1): 89-100.
65. Fuhrmann, A. and Engler, A.J. “The Cytoskeleton Regulates Cell Attachment Strength” *Biophys J*, 2015. 109(1): 57–65.
66. Kaushik, G., Spenlehauer, A., Sessions, A.O., Trujillo, A.S., Fuhrmann, A., Fu, Z., Venkatraman, V., Pohl, D., Tuler, J., Wang, M., Lakatta, E.G, Ocorr, K., Bodmer, R., Bernstein, S.I., Van Eyk, J.E., Cammarato, A., and Engler, A.J. “Vinculin-network mediated Cytoskeletal Remodeling and Regulation of Contractile Function in Aging Myocardium” *Science Trans Med*, 2015. 292: 292ra99.
67. Hribar, K.C., Finlay, D., Ma, X., Qu, X., Ondeck, M. G., Chung, P.H., Zanella, F., Engler, A.J., Sheikh, F., Vuori, K., Chen, S. “Nonlinear 3D projection printing of concave hydrogel microstructures for long-term multicellular spheroid and embryoid body culture” *Lab-on-a-Chip*, 2015. 15(11): 2412-2418.
68. Taylor-Weiner, H., Ravi, N., and Engler, A.J. “Traction Forces mediated by Integrin Signaling are Necessary for Definitive Endoderm Specification” *J Cell Sci*, 2015. 128(10): 1961-1968.
69. Wei, S.C., Fattet, L., Tsai, J.H., Guo, Y., Pai, V.H., Majecki, H.E., Chen, A.C., Sah, R.L., Taylor, S.S., Engler, A.J., and Yang J. “Matrix stiffness drives Epithelial-Mesenchymal Transition and tumor metastasis through a Twist1-G3BP2 mechanotransduction pathway” *Nature Cell Biology*, 2015. 17(5): 678-688.
70. Jun, I., Lee, Y.B., Choi, Y.S., Engler, A.J., Park, H., Shin, H. “Transfer stamping of human mesenchymal stem cell patches using thermally expandable hydrogels with tunable celladhesive properties.” *Biomaterials*, 2015. 54: 44-54.
71. Viswanathan, P.,\* Ondeck, M.G.,\* Chirasatitsin, S., Nghamkham, K., Reilly, G.C., Engler, A.J., and Battaglia, G. “3D Surface Topology Guides Stem Cell Adhesion and Differentiation” *Biomaterials*, 2015. 52:140-147. \*co-first authors
72. Meyer, G.A., Farris, A., Sato, E., Gibbons, M., Lane, J.G., Ward, S.R. and Engler, A.J. “Muscle Progenitor Cell Regenerative Capacity in the Torn Rotator Cuff” *J Ortho Res*, 2015. 33(3): 421-429.



73. Fuhrmann, A., and Engler, A.J. “Acute Shear Stress Dictates Adherent Cell Remodeling and Verifies Shear Profile of Spinning Disc Assays” *Phys Biol*, 2015. 12(1): 016011.
74. Thomas, K.A., Engler, A.J., and Meyer, G.A. “Extracellular Matrix Regulation in the Muscle Satellite Cell Niche” *Connective Tissue Res*, 2015. 56(1): 1-8.
75. Wen, J.H.,\* Vincent, L.G.,\* Choi, Y.S., Fuhrmann, A., Hribar, K., Taylor-Weiner, H., Chen, S., and Engler, A.J. “Interplay of Matrix Stiffness and Protein Tethering in Mechanically Based Differentiation” *Nature Materials*, 2014. 13(10): p. 979-987. \*co-first authors
76. Young, J.L., Kretschmeyer, K., Ondeck, M. G., Zambon, A.C., and Engler, A.J. “Mechanosensitive Kinases Regulate Stiffness-Induced Cardiomyogenesis” *Sci Reports*, 2014. 4: 6425.
77. Hribar, K.C., Choi, Y.S., Ondeck, M., Engler, A.J., Chen, S. “Digital Plasmonic Patterning of Hydrogels” *Adv Funct Mat*, 2014. 24(31): 4922–4926.
78. Fuhrmann, A., Li, J., Chien, S., and Engler, A.J. “Cation Type Specific Cell Remodeling Regulates Attachment Strength” *PLOS ONE*, 2014. 9(7): e102424.
79. Murphy, W.L., McDevitt, T.C., and Engler, A.J. “Materials as stem cell regulators” *Nature Materials*, 2014. 13: 547–557.
80. Nishimura, M., Kumsta, C. Kaushik, G., Ding, Y., Bisharat-Kernizan, J., Cammarato, A., Ross, R.S., Engler, A.J., Bodmer, R., Hansen, M., and Ocorr, K. “Dual role of Integrin and Integrin Linked Kinase in cardiac aging and integrity” *Aging Cell*, 2014. 13(3): 431–440.
81. Viswanathan, M.C., Kaushik, G., Engler, A.J., Lehman, W., and Cammarato, A. “A Drosophila model of diastolic dysfunction and cardiomyopathy based on impaired troponin function” *Circ Research*, 2014. 114:e6-e17.
82. Holle, A.W., Tang, X., Vijayraghavan, D., Vincent, L.G., Fuhrmann, A., Choi, Y.S., del Alamo, J.C., and Engler, A.J. “In Situ Mechanotransduction via Vinculin Regulates Stem Cell Myogenesis” *Stem Cells*, 2013. 31(11): 2467-77.
83. Rao, N., Grover, G.N., Vincent, L.G., Evans, S.C., Choi, Y.S., Spencer, K.H., Hui, E.E., Engler, A.J., and Christman, K.L. “A co-culture device with a tunable stiffness to understand combinatorial cell-cell and cell-matrix interactions” *Integr. Biol.*, 2013. 5(11): 1344 – 1354.
84. Taylor-Weiner, H., Schwarzbauer, J.E., and Engler, A.J. “Defined Extracellular Matrix Components are Necessary for Definitive Endoderm Induction” *Stem Cells*, 2013. 31(10): 2084-94.
85. Young, D.A., Choi, Y.S., Engler, A.J., and Christman, K.L. “Mimicking the stiffness of adipose tissue stimulates adipogenesis of adult adipose-derived stem cells” *Biomaterials*, 2013. 34(34): 8581-8588.

86. Kiang, J.D., Wen, J.H., del Alamo, J.C., and Engler, A.J. “Dynamic and Reversible Surface Topography Influences Cell Morphology” *J Biomed Mat Res A*, 2013. 101A(8): 23132321.
87. Young, J.L., Tuler, J., Braden, R., Schüp-Magoffin, P., Schaefer, J., Kretchmer, K., Christman, K. L., and Engler, A.J. “In vivo response to dynamic hyaluronic acid hydrogels” *Acta Biomaterialia*, 2013. 9(7): 7151–7157.
88. Vincent, L.G., Choi, Y.S., Alonso-Latorre, B., del Alamo, J.C., and Engler, A.J. “Mesenchymal Stem Cell Durotaxis Depends on Substrate Stiffness Gradient Strength” *Biotechnology J*, 2013. 8(4): 472-84.
89. Joshi-Barr, S., Karpiak, J.V., Ner, Y., Wen, J.H., Engler, A.J., and Almutairi, A. “Density Gradient Multilayered Polymerization (DGMP): a novel technique for creating multicompartiment, customizable scaffolds for tissue engineering.” *J Vis Exp*, 2013. 72: e50018.
90. Viswanathan, P.,\* Chirasatitsin, S.,\* Ngamkham, K., Engler, A.J.<sup>#</sup>, and Battaglia, G.<sup>#</sup> “Cell instructive microporous scaffolds through interface engineering” *J Am Chem Soc*, 2012. 134(49): 20103-9. \*co-first authors <sup>#</sup>co-corresponding authors
91. Choi, Y.S., Vincent, L.G., Lee, A.R., Kretchmer, K.C., Chirasatitsin, S., Dobke, M.K., and Engler, A.J. “The alignment, fusion and striation assembly of adipose-derived stem cells on mechanically patterned hydrogel matrices” *Biomaterials*, 2012. 33(29): 6943-6951.
92. Park, J.S., Kim, P., Helen, W., Engler, A.J., Levchenko, A., Kim, D-H. “Control of stem cell fate and function by engineering physical microenvironments” *Integr. Biol.*, 2012. 4(9): 1008–1018.
93. Kaushik, G., Zambon, A., Fuhrmann, A., Bernstein, S.I., Bodmer, R., Engler, A.J., and Cammarato, A. “Measuring passive myocardial stiffness in *Drosophila melanogaster* to investigate diastolic function.” *J Cell Mol Med*, 2012. 16(8): 1656-1662.
94. Choi, Y.S., Vincent, L.G., Lee, A.R., Dobke, M.K., and Engler, A.J. “Mechanical Derivation of Functional Myotubes from Adipose-Derived Stem Cells.” *Biomaterials*, 2012. 33(8): 2482-2491.
95. Kaushik, G., Fuhrmann, A., Cammarato, A.,\* and Engler, A.J.\* “Indentation Analysis of Soft Bilayers: In Situ Measurements of *Drosophila* Myocardial Stiffness” *Biophys J*, 2011. 101(11): 2629-2637. \*co-corresponding authors
96. Holle, A.W., and Engler, A.J. “More Than a Feeling: Discovering, Understanding, and Influencing Mechanosensing Pathways” *Curr Opin Biotech*, 2011. 22(5): 648-54.
97. Battaglia, G., LoPresti, C., Forster, S., Massignani, M., Warren, N., Madsen, J., Armes, S., Vasilev, C., Hobbs, J., Chirasatitsin, S., and Engler, A.J. “Wet nano-scale imaging and testing of polymersomes” *Small*, 2011. 7(14): 2010-5.

98. LoPresti, C., Massignani, M., Fernyhough, C., Blanazs, A., Ryan, A.J., Madsen, J., Warren, N.J., Armes, S.P., Lewis, A.L. Chirasatitsin, S., Engler, A.J., and Battaglia, G. “Controlling Polymersomes Surface Topology at the Nanoscale by Membrane Confined Polymer/Polymer Phase Separation” *ACS Nano*, 2011. 5(3): 1775-84.
99. Tse, J.R. and Engler, A.J. “Stiffness Gradients Mimicking *In Vivo* Tissue Variation Regulate Mesenchymal Stem Cell Fate” *PLoS One*, 2011. 6(1): e15978.
100. Young, J.L., and Engler, A.J. “Hydrogels with Time-Dependent Mechanical Properties Enhance Cardiomyocyte Differentiation *In Vitro*” *Biomaterials*, 2011. 32(4): 1002-1009.
101. Flores-Merino, M.V.,\* Chirasatitsin, S.,\* LoPresti, C., Reilly, G.C., Battaglia, G., and Engler, A.J. “Nanoscale Mechanical Anisotropy in Hydrogel Surfaces” *Soft Matter*, 2010. 6(18): 4466-4470. \*co-first authors
102. Tse, J.R. and Engler, A.J. “Preparation of Hydrogel Substrates with Tunable Mechanical Properties” *Curr Protoc Cell Biol*, 2010. Chapter 10: Unit 10.16: 1-16.
103. Chirasatitsin, S. and Engler, A.J. “Detecting Cell-Adhesive Sites in Extracellular Matrix using Force Spectroscopy Mapping” *J Phys: Condensed Matter*, 2010. 22(19): 194102
104. Reilly, G.C. and Engler, A.J. “Intrinsic Extracellular Matrix Properties Regulate Stem Cell Differentiation” *J Biomechanics*, 2010. 43(1): 55-62.
105. Engler, A.J., Humbert, P.O. Wehrle-Haller, B., and Weaver, V.M. “Multiscale Modeling of Form and Function” *Science*, 2009. 308: 208-212.
106. Sen, S., Engler, A.J., Discher, D.E. “Matrix Strains Induced by Cells: Computing How Far Cells Can Feel” *Cell and Mol Bioeng*, 2009. 2(1): 39-48.
107. Oh, S., Brammer, K.S., Li, Y.S.J., Teng, D., Engler, A.J., Chien, S., and Jin, S. “Stem Cell Fate Dictated Solely by Altered Nanotube Dimension” *Proc Nat Acad Sci USA*, 2009. 106(7): 2130-2135.
108. Engler, A.J., Chan, M., Boettiger, D., and Schwarzbauer, J.E. “A Novel Mode of Cell Detachment from Fibrillar Matrix under Shear” *J Cell Sci*, 2009. 122(10): 1647-53.
109. Williams, C.M., Engler, A.J., Slone, R.D., Galante, L., and Schwarzbauer, J.E. “Fibronectin Modulates Mammary Epithelial Cell Proliferation During Acinar Differentiation” *Cancer Res*, 2008. 68(9) 3185-3192.
110. Engler, A.J., Carag-Krieger, C., Johnson, C.P., Raab, M., Tang, H.-Y., Speicher, D.W., Sanger, J.W., Sanger, J.M., and Discher, D.E. “Embryonic Cardiomyocytes Beat Best on a Matrix with Heart-like Elasticity: Scar-like Rigidity Inhibits Beating” *J Cell Sci*, 2008. 121(22): 3794-3802.

111. Rehfeldt, F., Engler, A.J., Eckhardt, A., Ahmed, F., and Discher, D.E. “Cell Responses to the Mechanochemical Microenvironment—Implications for Regenerative Medicine and Drug Delivery,” *Adv Drug Deliv Rev*, 2007. 59: 1329-1339.
112. Engler, A.J., Sen, S., Sweeney, H.L., and Discher, D.E. “Matrix Elasticity Directs Stem Cell Lineage Specification” *Cell*, 2006. 126(4): 677-689.
113. Brown, A.G., Leite, R.S., Engler, A.J., Discher, D.E., Strauss, J.F. “A hemoglobin fragment found in cervicovaginal fluid from women in labor potentiates the action of agents that promote contraction of smooth muscle cells.” *Peptides*, 2006. 27(7):1794-800
114. Berry, M.F., Engler, A.J., Woo, Y.J, Pirolli, T.J., Bish, L.T., Bell, P., Jayasankar, V., Morine, K.J., Gardner, T.J., Discher, D.E., and H.L. Sweeney “Mesenchymal Stem Cell Injection After Myocardial Infarction Improves Myocardial Compliance” *Am J Physiol: Heart Circ Physiol*, 2006. 290(6): H2196-H2203.
115. Dahl, K.N., Engler, A.J., Pajerowski, J.D., and Discher, D.E. “Power-law rheology of isolated nuclei and mapping deformation of subnuclear domains” *Biophysical J*, 2005. 89(4): 2855-2864.
116. Zaari, N., Rajagopalan, P., Kim, S.K., Engler, A.J., and Wong, J.Y. “Hydrogels Photopolymerized in a Microfluidics Gradient Generator: Tuning Substrate Compliance at the Microscale to Control Cell Response” *Advanced Materials*, 2004. 16(23-24): 2133-2137.
117. Engler, A.J., Griffin, M.A., Sen, S., Bonnemann, C.G., Sweeney, H.L. and Discher, D.E. “Myotubes Differentiate Optimally on Substrates with Tissue-like Stiffness: Pathological Implications of Stiff and Soft Microenvironments” *J Cell Biology*, 2004. 166(6): 877887.
118. Engler, A.J., Richert, L., Wong, J.Y., Picart, C., and Discher, D.E. “Surface Probe Measurements of the Elasticity of Sectioned Tissue, Thin Gels and Polyelectrolyte Multilayer Films: Correlations between Substrate Stiffness and Cell Adhesion” *Surface Science*, 2004. 570:142-154.
119. Richert, L., Engler, A.J., Discher, D.E., and Picart, C. “Surface Measurement of the Elasticity of Native and Cross-linked Polyelectrolyte Multilayer Films” *Biomacromolecules*, 2004. 5(5): 1908-1916.
120. Dalhaimer, P., Engler, A.J., Parthasarthy, R., and Discher, D.E. “Targeted worm micelles” *Biomacromolecules*, 2004. 5(5): 1714-1719.
121. Griffin, M.A., Engler, A.J., Barber, T.A., Healy, K.E., Sweeney, H.L., and Discher, D.E. “Patterning, Prestress, and Peeling Dynamics of Myocytes” *Biophysical J*, 2004. 86(2): 1209-1222.
122. Engler, A.,\* Bacakova, L.,\* Newman, C., Hategan, A., Griffin, M., and Discher, D. “Substrate Compliance versus Ligand Density in Cell on Gel Responses.” *Biophysical J*, 2004. 86(1): 617-628. \*co-first authors

**BOOK CHAPTERS**

1. Mayner, J., Demeester, E., Engler, A.J., “Combining Genetic and Mechanical Factors to Model Disease” in *Material-based Mechanobiology*, Nakanishi, J. and Koichiro Uto, K., editors. 2022, Royal Society of Chemistry Book. Vol: 12, pg. 309-337.
2. Whitehead, A.J., Kirkland, N., and Engler, A.J. “Atomic Force Microscopy for Live-Cell and Hydrogel Measurement” in *Myofibroblasts: Fundamentals, Laboratory Methods and Anti-Fibrotic Drug Discovery*, Series: *Methods. Mol. Biol.*, Hinz, B. and Lagares, D., Editors. 2021, Springer Nature. Vol: 2299, pg. 217-226.
3. Young, J.L., Christman, K.L. and Engler, A.J. “Stem Cells for Cardiac Tissue Engineering” in *Engineering Stem Cells for Tissue Regeneration*, 2nd edition. eds. Li, S., L’Heureux, N., and Elisseff, J.H., World Scientific Publishing Co., Singapore. Pg. 53-75.
4. LaPointe V.L.S., de Boer, J., and Engler, A.J. “Cellular Signaling” in *Tissue Engineering*, van Blitterswijk, C. and J. de Boer, Editors. 2014, Elsevier Science: London. Vol. 2. Pg. 111-148.
5. Kaushik, G. and Engler, A.J. “From Stem Cells to Cardiomyocytes: The Role of Forces in Cardiac Maturation, Aging, and Disease” in *Progress in Molecular Biology and Translational Science*, Kumar, S. and A. J. Engler, Editors. 2014, Elsevier Science: London. Vol. 126, pg. 219–242.
6. Oudek, M.G. and Engler, A.J. “Dynamic Materials Mimic Development and Disease Changes in Tissues” in *Bio-inspired Materials for Biomedical Engineering*, Brennan, A.B. and Kirschner, C.M., Editors. 2014, John Wiley & Sons: New York. pg. 25-44.
7. Wen, J.H., Taylor-Weiner, H., Fuhrmann, A. and Engler, A.J. “Cell Mechanics on Surfaces” in *Biomaterials Surface Science*, Taubert, A, Mano, J. and Rodriguez-Cabello, J.C., Editors. 2013, Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim, Germany. pg. 511537.
8. Choi, Y.S., Holle, A.W., and Engler, A.J. “Engineered ECM Microenvironments and their Regulation of Stem Cells” in *Extracellular Matrix in Development from Biology of Extracellular Matrix* (series), Mecham, R. and DeSimone, D., Editors. 2013, Springer: Heidelberg. pg. 133160.
9. Varghese, S. and Engler, A.J. “Musculoskeletal Cell Mechanics” in *Orthopaedic Biomechanics*, Winkelstein, B.A., Ed. 2012, Taylor & Francis: New York. pg. 303-325.
10. Vincent, L., and Engler, A.J. “Effect of Substrate Modulus on Cell Function and Differentiation” in *Comprehensive Biomaterials*, Healy, K.E., Ducheyne, P., and J. Kirkpatrick, Editors. 2011, Elsevier Science: London. Vol. 5. pg. 51-64.
11. Helen, W. and Engler, A.J. “Mechanobiology in the Stem Cell Niche: Integrating Physical and Chemical Regulation of Differentiation,” in *Mechanobiology Handbook*, Nagatomi, J., Ed. 2010, CRC Press: Boca Raton, FL. pg. 439-455.

12. Young, J.L., Christman, K.L., and Engler, A.J. “Stem Cells for Cardiac Tissue Engineering,” in *Stem Cells and Tissue Engineering*, S. Li, N. L’Heureux, and J.H. Elisseeff, Editors. 2010, World Scientific Publishing: Singapore. pg. 95-114.
13. Rehfeldt, F., Engler, A.J., and Discher, D. E. “Stem Cells and Nanomedicine: Nanomechanics of the Microenvironment,” in *Nanotechnology*, 2010. 305–322.
14. Engler, A.J., Rehfeldt, F., Sen, S., and Discher, D.E., “Micro-Tissue Elasticity: Measurements by Atomic Force Microscopy and its Influence on Cell Differentiation,” in *Methods in Cell Biology: Cell Mechanics*, D.E. Discher and Y-L Wang, Editors. 2007, Elsevier: New York. pg. 521-545.
15. Frey, M.T., Engler, A., Discher, D.E., Lee, J., and Wang, Y-L, “Microscopic Methods for Measuring the Elasticity of Gel Substrates for Cell Culture: Microspheres, Microindenters, and Atomic Force Microscopy,” in *Methods in Cell Biology: Cell Mechanics*, D.E. Discher and Y-L Wang, Editors. 2007, Elsevier: New York. pg. 47-65.

### **COMMENTARIES**

1. Engler, A.J. and Cooper-White, J. “Academic vs industry perspectives in 3D bioprinting” *APL Bioeng* 2020. 4(1): 010401.
2. Engler, A.J. and Discher, D.E. “Rationally engineered advances in cancer research” *APL Bioeng* 2018. 2(3): 031601.
3. Vincent, L.G. and Engler, A.J. “Stem Cell Differentiation: Post degradation Forces Kick-in” *Nat Materials* 2013. 12(5): 384-6.
4. Holle, A.W. and Engler, A.J. “Cell rheology: Stressed-out stem cells” *Nat Materials* 2010. 9(1): 4-6.
5. Merryman, W.D. and Engler, A.J. “Innovations in cell mechanobiology.” *J Biomech.* 2010 Jan 5; 43(1): 1-2.
6. Oh, S., Brammer, K.S., Li, Y.S.J., Teng, D., Engler, A.J., Chien, S., and Jin, S. “Reply to von der Mark et al.: Looking further into the effects of nanotube dimension on stem cell fate” *Proc Nat Acad Sci USA*, 2009. 106(24): E61.

### **U.S. PATENTS**

1. Engler, A.J., Banisadr, A., Beri, P., and Fuhrmann, A. “Method and Device for Early Cancer Screening” (Application 17/180,492)
2. Kumar, A, Ondeck, M., Engler, A.J. “Systems and Methods of Disease Modeling Using Static and Time-dependent Hydrogels.” (US20170328889)
3. Engler, A.J., Sweeney, H.L., and Discher D.E. “Regulating stem cell differentiation by controlling matrix elasticity” (US2007190646)

### **INVITED TALKS**

“Understanding Gene-Environment interactions in Cardiovascular Regeneration”

American Institute of Chemical Engineering – “Rock Stars of Regen Engineering”  
Symposium (2023); La Jolla, CA **NEW**

*“Understanding and Exploiting Cancer Mechanobiology”*

Department of Biomedical Engineering, UC Irvine (2023); Irvine, CA  
 Department of Chemical Engineering, Iowa State University (2023); Ames, IA  
 Department of Biomedical Engineering, Columbia University (2022); NY, NY  
 4th International Mechanobiology Conference (2022); Sydney, NSW Australia  
 Biomedical Engineering Society Meeting (2022); San Antonio, TX  
 Department of Biomedical Engineering, University of Texas at Dallas (2022); Dallas, TX  
 Department of Biomedical Engineering, University of Delaware (2022); Newark, DE  
 ITREN-MRC Korean Mechanobiology (2022)  
 BMES Cellular and Molecular Bioengineering Meeting (2022); Indian Wells, CA  
 Matrix Biology Australia-New Zealand Festival (2021); Online  
 Department of Bioengineering, University of Washington (2021); Online  
 Mechanobiology in Health and Disease, Nature Conferences and Chinese Academy of Medical  
 Sciences (2020); Beijing, China (postponed)  
 Multiscale Modeling and Cell Fate Processes Workshop, UC Irvine (2020): Online  
 Department of Biomedical Engineering, Syracuse University (2020); Online  
 Department of Biomedical Engineering, Virginia Commonwealth University (2020); Online  
 Department of Bioengineering, University of Washington (2020); Seattle, WA  
 Mechanobiology SIG, 64<sup>th</sup> Biophysical Society Annual Meeting (2020); San Diego, CA  
 Society for Engineering Science Annual Meeting (2019); St. Louis, MO  
 13<sup>th</sup> Aegean Conference on Pathways, Networks and Systems Medicine (2019); Crete, Greece

*Improving Cardiovascular “Disease-in-a-Dish” with Active Materials*

7th PCTC Cardiovascular Bioengineering (CVBE) Symposium (2023); Kyoto, Japan  
 Department of Bioengineering, University of California, Santa Barbara (2023); Goleta,  
 CA  
 World Congress on Biomechanics (2022); Taipei, Taiwan  
 Smidt Heart Institute Frontiers in Heart Research Seminar Series (2021); Cedars Sinai  
 Medical Center; Online  
 Annual Biomedical Engineering Society Meeting (2021); Orlando, FL  
 World Biomaterials Congress (2020); Online  
 Department of Bioengineering, University of Washington (2020); Online  
 BMES Cellular and Molecular Bioengineering Meeting (2020); San Juan, PR  
 Dept. of Bioengineering, University of Colorado, Denver (2019); Denver, CO  
 8th Symposium on Regenerative Rehabilitation (2019); Charlottesville, VA  
 RIKEN BDR Symposium “Control and Design of Biosystems” (2019); Kobe, Japan  
 International Symposium on Nanoarchitectonics for Mechanobiology (2019); Tsukuba, Japan  
 9<sup>th</sup> International Conference on Advanced Materials and Nanotechnology (2019);  
 Wellington, New Zealand  
 BMES Cellular and Molecular Bioengineering Meeting (2019); San Diego, CA  
 6<sup>th</sup> International Conference on Stem Cell Engineering (2018); Los Angeles, CA  
 American Society for Matrix Biology (2018); Las Vegas, NV  
 IUTAM Symposium on Mechanical Environments of Living Cells (2018); Xi’an, China  
 8th World Congress of Biomechanics (2018); Dublin, Ireland  
 AHA/ASA International Stroke Conference (2018); Los Angeles, CA  
 8<sup>th</sup> AFMBIOMED Meeting (2017); Krakow, Poland

Matrix Biology Ireland (2017); Dublin, Ireland  
 Dept. of Bioengineering, University of Pennsylvania (2017); Philadelphia, PA  
 NIH Cardiovascular Tissue Engineering Meeting (2017); Birmingham, AL  
 Society for Biomaterials (2017); Minneapolis, MN  
 BMES Cellular and Molecular Bioengineering Meeting (2017); Kona, HI  
 Dept. of Bioengineering, University of California, Berkeley (2016); Berkeley, CA  
 Biophysical Society Thematic Meeting: Mechanobiology of Disease (2016); Singapore  
 1st International Conference of Molecular Engineering of Polymers (2016); Shanghai, China  
 Carolina Biophysics Symposium (2016); Chapel Hill, NC  
 Dept. of Biomedical Engineering, Cornell University (2016); Ithaca, NY

*“Genome-Edited Cardiac Models Reveal that Combinatorial Genetic Interactions can Impair Mechanotransduction”*

AICHe Rockstars of Regenerative Medicine (2023); La Jolla, CA  
 Cardiovascular Research Center, University of Virginia (2019); Charlottesville, VA  
 8th World Congress of Biomechanics (2018); Dublin, Ireland  
 Biomedical Engineering Society Meeting (2018); Atlanta, GA

*“Niche Dynamics Promote Epithelial-Mesenchymal Transition via Mechanical Signaling”*

Dept. of Mechanical Engineering, University of Southern California (2018); Los Angeles, CA  
 American Society for Investigative Pathology @ Experimental Biology Meeting (2018); San Diego, CA  
 American Society for Matrix Biology (2016); St. Petersburg, FL  
 Biomedical Engineering Society Meeting (2016); Minneapolis, MN  
 World Biomaterials Congress (2016); Montreal, Canada  
 American Association of Anatomist @ Experimental Biology Meeting (2016); San Diego, CA  
 American Chemical Society Biennial Meeting (2016); San Diego, CA  
 55<sup>th</sup> Annual American Society for Cell Biology Meeting (2015); San Diego, CA  
 Gordon Conference: Collagen (2015); New London, NH  
 Wake Forest Institute for Regenerative Medicine (2015); Winston-Salem, NC  
 Biomedical Engineering Society Meeting (2015); Tampa, FL  
 Fischell Dept. of Bioengineering, University of Maryland (2015); College Park, MD  
 Cell-Matrix Mechanobiology Workshop (2015); Urbana-Champaign, IL

*“Mechanical Signaling and its Role in Differentiation, Aging, and Disease”*

Biomedical Engineering Society Meeting (2018); Atlanta, GA  
 American Association of Anatomist @ Experimental Biology Meeting (2016); San Diego, CA  
 Biomaterials Seminar Series, University of Michigan (2015); Ann Arbor, MI  
 XIII Simpósio Brasileiro de Matriz Extracelular (2015); Buzios, Rio de Janeiro, Brazil  
 Dept. of Bioengineering, University of California, Riverside (2015); Riverside, CA  
 Dept. of Biomedical Engineering, University of Minnesota (2015); Minneapolis, MN  
 Stem Cell Institute, University of Southern California (2015); Los Angeles, CA  
 14<sup>th</sup> Annual ISSCR Meeting (2015); Stockholm, Sweden  
 Summer Biomechanics, Bioengineering, and Biotransport Conference (2015); Snowbird, UT  
 Wake Forest Institute for Regenerative Medicine (2015); Winston-Salem, NC  
 International Workshop on Multiscale Mechanobiology (2015); New York, NY



*“Cytoskeletal remodeling modulates cardiomyocyte contractile function during aging”*

Summer Biomechanics, Bioengineering & Biotransport Conference (2016); Washington, D.C.  
 7<sup>th</sup> AFMBIOMED Meeting (2016): Porto, Portugal  
 Insect Muscle Meeting, Johns Hopkins University (2015); Baltimore, MD  
 Develop and Aging Program, Sanford-Burnham Medical Research Institute (2015); La Jolla, CA  
 Dept of Pathology, UC San Diego (2014); La Jolla, CA  
 World Congress of Biomechanics (2014); Boston, MA  
 Dept. of Bioengineering, University of Washington (2014); Seattle, WA

*“Interplay of Material Stiffness and Protein Tethering in Mechanically Based Differentiation”*

Dept. of Physics, Wake Forest University (2015); Winston-Salem, NC  
 24<sup>th</sup> Cytometry Development Workshop: Technologies for Cell Analysis (2014); La Jolla, CA  
 Biomedical Engineering Society Meeting (2014); San Antonio, TX  
 9<sup>th</sup> Stem Cell Meeting on the Mesa (2014); La Jolla, CA  
 NHLBI Workshop on Lung Mechanobiology (2014); Bethesda, MD  
 World Congress of Biomechanics (2014); Boston, MA  
 Nature Conference on Genomic Technologies and Biomaterials (2014); San Diego, CA  
 International Workshop on Multiscale Mechanobiology (2014); Hong Kong, China  
 Dept. of Bioengineering, University of California, Los Angeles (2014); Los Angeles, CA  
 Dept. of Biomedical Engineering, Georgia Tech (2014); Atlanta, GA

*“Traction Forces via Integrin Signaling are Necessary for Endoderm Specification”*

American Society for Matrix Biology (2014); Cleveland, OH  
 World Congress for Regenerative Medicine (2013); Leipzig, Germany

*“Cell instructive scaffolds through interface engineering”*

3<sup>rd</sup> Global Congress on NanoEngineering for Medicine and Biology (2014); San Francisco, CA  
 World Congress for Regenerative Medicine (2013); Leipzig, Germany  
 Stony Brook University Stem Cell Symposium (2013); Stony Brook, NY  
 Cambridge Stem Cell Institute Symposium (2013); Cambridge, UK  
 Dept of Mechanical Engineering, POSTECH University (2013); Pohang, Republic of Korea  
 43<sup>rd</sup> Princess Takamatsu Cancer Symposium (2012); Tokyo, Japan  
 Cell Biophysics Summer School, University of Ottawa (2012); Ottawa, Canada  
 Gordon Conference: Signal Transduction By Engineered ECMs (2012); Biddeford, ME  
 9<sup>th</sup> World Biomaterials Congress (2012); Chengdu, China  
 International Conference on Stem Cell Engineering (ICSCE) (2012); Seattle, WA  
 Spring Meeting, Material Research Society (MRS) (2012); San Francisco, CA

*“Vinculin Mechanosensing and its Role in Differentiation, Disease, and Aging”*

Dept. of Biophysics, University of Gottingen (2013); Gottingen, Germany  
 8<sup>th</sup> Stem Cell Meeting on the Mesa (2013); La Jolla, CA  
 Dept. of Bioengineering, University of California, Irvine (2013); Irvine, CA  
 Graduate Programs in Bioengineering and Pharmaceutical Sciences & Pharmacogenomics;  
 University of California, San Francisco (2013); San Francisco, CA  
 Dept of Biomedical Engineering; Tufts University (2013); Medford, MA

Dept of Biochem & Mol Genetics; University of Alabama-Birmingham (2013); Birmingham, AL

Muscle Development & Regeneration Program; Sanford-Burnham Institute (2013); La Jolla, CA

Dept. of Bioengineering, University of Pennsylvania (2013); Philadelphia, PA

Regen. Med. & Rehab. Mtg., American Physical Therapy Assoc. (2012); Beaver Hollow, NY

Amer. Soc. for Investigative Pathology Experimental Biology Meeting (2012); San Diego, CA

Dept. of Cell and Developmental Biology, Vanderbilt University (2012); Nashville, TN

American Physical Society March Meeting (2012); Boston, MA

Dept. of Cardiology, University of California, San Diego (2012); La Jolla, CA

Rheumatology, Allergy & Immunology Seminars Series, UCSD (2011); San Diego, CA

Bionanotechnology IGERT, UIUC (2011); Urbana-Champaign, IL

*“Probing Mechanisms of Mechano-sensitive Differentiation in Mesenchymal Stem Cells”*

Division of Physics, University of California, San Diego (2012); La Jolla, CA

Institute for Bioeng’g; Ecole Polytechnique Federale de Lausanne (2011); Lausanne, Switzerland

American Physiological Society @ Experimental Biology Meeting (2011); Washington, DC

Tokyo Medical and Dental University (2011); Tokyo, Japan

Translational Excellence in Regenerative Medicine Meeting (2010); Amsterdam, Netherlands

Dept. of Mech. & Aerospace Eng’g, University of California, San Diego (2010); La Jolla, CA

ASME Summer Bioengineering Conference (2010); Naples, FL

*“Intrinsic Matrix Properties Govern Embryonic Stem Cell Function”*

INSERM/Nantes Stem Cell Meeting (2011); Nantes, France

American Society for Matrix Biology Biennial Meeting (2010); Charleston, SC

Gordon Conference: Signal Transduction By Engineered ECMs (2010); Biddeford, ME

American Association of Anatomist @ Experimental Biology Meeting (2010); Anaheim, CA

Dept. of Bioengineering, University of California, Berkeley (2010); Berkeley, CA

Dept. of Bioengineering, University of California, Irvine (2010); Irvine, CA

2<sup>nd</sup> TERMIS World Congress (2009); Seoul, South Korea

Tissue & Cell Engineering Society Annual Meeting (2009); Glasgow, Scotland UK

British Society for Matrix Biology Meeting (2009); London, England UK

*“Towards ‘Smart’ Materials to Mimic Stem and Cardiomyocyte Microenvironments”*

2<sup>nd</sup> TERMIS World Congress (2009); Seoul, Republic of Korea

Dept. of Mech. & Aerospace Eng’g, University of California, San Diego (2009); La Jolla, CA

Biomedical Sciences Program, University of California, San Diego (2009); La Jolla, CA

Stem Cell Institute, Salk Institute (2009); La Jolla, CA

Dept. of Cardiology, University of California, San Diego (2009); La Jolla, CA

*“Stem Cells are Touchy-Feely: A Role for Matrix in Development and Disease”*

Tokyo Medical and Dental University (2011); Tokyo, Japan

Dept. of Biomedical Engineering; University of Alabama-Birmingham (2008); Birmingham, AL

Annual Biomedical Engineering Society (2008); St. Louis, MO

19<sup>th</sup> Federation of European Connective Tissue Societies Meeting (2008); Marseille, France  
 47<sup>th</sup> Annual American Society for Cell Biology Meeting (2007); Washington, D.C.

37<sup>th</sup> International Sun Valley Workshop on Skeletal Tissue Biology (2007); Sun Valley, ID  
 Dept. of Biomedical Engineering; University of Wisconsin-Madison (2007); Madison, WI  
 Institute for Bioeng'g; Ecole Polytechnique Federale de Lausanne (2007); Lausanne, Switzerland

Dept. of Biomedical Engineering; Boston University (2007); Boston, MA  
 IEEE-Engineering Medicine and Biology Society Annual Meeting (2006); New York, NY

Pennsylvania Muscle Institute Symposium (2006); Philadelphia, PA

12<sup>th</sup> International Congress of Biorheology (2005); Chongqing, P.R. China

Gordon Conference: Signal Transduction By Engineered ECMs (2004); Lewiston, ME

Pennsylvania Muscle Institute Symposium (2004); Philadelphia, PA

## RESEARCH FUNDING

### ACTIVE SUPPORT

<b>National Institutes of Health</b>		7/2013-5/2024 (n.c.e.)
2R01AG045428	Engler (PI)	\$2,010,438 TC
Title: <i>Mechanogenetics: An Integrated Approach to Aging in Muscle Dysfunction</i>		
<b>National Institutes of Health</b>		6/2018-5/2024
R25EB023839	Engler (PI)	\$108,000 TC
Title: <i>Interprofessional Design and Entrepreneurship in Medical Devices at UC San Diego</i>		
<b>National Institutes of Health</b>		4/2020 - 3/2025
R01NS116802	Engler (PI); Furnari (co-PI)	\$2,125,505 TC
Title: <i>Biophysical Interrogation of Signals that Drive GBM Invasion</i>		
<b>cy pres from Krueger vs. Wyeth</b>		9/2021 - 8/2024
CS0394411	Engler (PI)	\$710,026 DC
Title: <i>Identifying Prognostic Signatures of Invasive HRT-Induced Breast Cancers</i>		
<b>cy pres from Krueger vs. Wyeth</b>		9/2021 - 8/2026
CS0394213	Yang (PI); Engler (co-PI)	\$1,574,000 DC
Title: <i>Targeting mechanotransduction to inhibit metastasis in breast cancer patients with high mammographic density</i>		
<b>National Institutes of Health</b>		4/2022-3/2026
2R01HL132141	Pilz (PI); Engler (co-I)	\$2,926,484 TC
Title: <i>A novel treatment of aortic disease in Marfan Syndrome targeting oxidative stress and PKG dysregulation</i>		
<b>WuTsai Foundation</b>		3/2021 - 2/2031
n/a	McCulloch (PI); Engler (co-I)	\$20,000,000 DC
Title: <i>WuTsai Human Performance Alliance at UC San Diego</i>		

<b>Ionis-ARPA</b>		4/2022 - 3/2036
n/a	Eliceiri (PI); Engler (co-I)	\$1,915,311 TC
Title: <i>Bifunctional extracellular vesicles as therapeutic delivery platforms</i>		
<b><u>PENDING SUPPORT</u></b>		
<b>National Institutes of Health</b>		4/2023 - 3/2028
R01CA280279	Engler (PI); Lamers (co-PI)	\$2,978,447 TC
Title: <i>Material Stiffness Directs Oral Cancer Migration</i>		
<b><u>COMPLETED SUPPORT</u></b>		
<b>National Science Foundation</b>		4/2019-3/2023
1852609	Engler (PI)	\$351,601 TC
Title: <i>REU Site: Engineered Materials for Tissue Engineering and Drug Delivery</i>		
<b>National Institutes of Health</b>		8/2016-7/2022
R01CA206880	Engler (PI); Yang (co-PI)	\$1,805,706 TC
Title: <i>Biomaterial Mimicry of Dynamic Matrix Stiffening During Tumor Progression</i>		
<b>National Science Foundation</b>		9/2018-8/2021
1763139	Engler (PI); Katira (co-PI)	\$591,607 TC
Title: <i>Collaborative Research: Heterogeneous Cancer Cell Mechanics Differentially Drives Mechanosensing and Migration</i>		
<b>National Institutes of Health</b>		5/2018-4/2021
R21CA217735	Engler (PI)	\$620,000 TC
Title: <i>Developing Adhesive Technology as a Physical Marker of Highly Metastatic Cells</i>		
<b>Sekisui Chemical Co.</b>		10/2017-9/2019
20180646	Engler (PI)	\$155,000 TC
Title: <i>Developing PVA/B-based Biomaterials for Cardiovascular Applications</i>		
<b>National Science Foundation</b>		4/2016-3/2019
1559781	Engler (PI)	\$359,097 TC
Title: <i>REU Site: Engineered Materials for Tissue Engineering and Drug Delivery</i>		
<b>National Science Foundation</b>		4/2015-3/2018
1463689	Engler (PI)	\$400,000 TC
Title: <i>Strain-Activated Signaling within Cell Adhesions Dictates Cell Fate</i>		
<b>National Institutes of Health</b>		9/2011-8/2016
P30AR061303	Lieber (PI); Engler (co-Inv)	\$3,352,905 TC
Title: <i>San Diego Skeletal Muscle Research Center</i>		
<b>Department of Defense/CDMRP</b>		6/2013-5/2016

W81XWH-13-1-0133	Yang (PI); Engler (partnering PI)	\$116,250 TC
Title: <i>Regulation of Breast Cancer Stem Cell by Tissue Rigidity</i>		
<b>National Institutes of Health</b>		7/2010-6/2015
R01HL103566	Omens (PI); Engler (co-Inv)	\$1,931,250 TC
Title: <i>Cardiomyocyte mechanotransduction through the integrin complex</i>		
<b>Muscular Dystrophy Association</b>		8/2012-7/2015
241665	Engler (PI)	\$390,000 TC
Title: <i>Mechanically programmed adipose-derived stem cells to treat muscular dystrophy</i>		
<b>National Institutes of Health</b>		9/2009-8/2014
DP02OD006460	Engler (PI)	\$2,317,500 TC
Title: <i>"Smart" Materials to Engineer a More Complete Stem Cell Niche</i>		
<b>National Institutes of Health</b>		8/2012-7/2013
U54CA143803-03	Austin (PI); Engler (co-Inv)	\$77,500 TC
Title: <i>"Adhesive heterogeneity as an indicator of metastatic state"</i>		
<b>National Institutes of Health</b>		7/2011-6/2013
R21HL106529	Engler (PI)	\$396,675 TC
Title: <i>Stem Cells and Dynamic Materials Improve Cardiac Function Post-Myocardial Infarction</i>		
<b>Human Frontier Science Program</b>		5/2010-4/2013
RGY0064/2010	Engler (PI)	\$750,000 TC
Title: <i>Stem Cell Differentiation in 3D Nanostructured Environments</i>		
<b>National Institutes of Health</b>		5/2010-4/2012
R21EB011727	Engler (PI)	\$357,807 TC
Title: <i>Improving Endoderm Specification with Hybrid Materials and Growth Factors</i>		
<b>American Heart Association</b>		7/2008-6/2010
Beginning Grant-in-Aide: 0865150F	Engler (PI)	\$140,000 TC
Title: <i>From Physical to Molecular Mechanisms Governing Cardiomyocyte Function</i>		
<b>University of California, San Diego Academic Senate</b>		1/2009-12/2009
RI-324G-ENGLER	Engler (PI)	\$8,595 TC
Title: <i>Undergraduate Research in Stem Cell Bioengineering</i>		

## UNIVERSITY AND PROFESSIONAL SERVICE

### UNIVERSITY COMMITTEE SERVICE

#### • University of California, San Diego, La Jolla, CA

Department of Bioengineering Undergraduate Studies Committee (2009-2016); Department of

Bioengineering Graduate Studies Committee (2016-2017); Department of Bioengineering Vice Chair (2018-present); Medical Scientist Training Program Committee (MSTP; 2010-present; *admission chair*, 2014-2017; *assoc. director* 2017-present); Academic Internship Program Faculty Advisory Board (AIP; 2011-2014); Sanford Consortium for Regenerative Medicine (SCRM) Space Committee (2012-2019; *chair*, 2016-2018); Engineering Medical School Liaison Council (2013-present); Academic Senate Committee on Research (2016-2019; *vice chair* 2017-2018; *chair* 2018-2019)

### **TEACHING SERVICE**

- **University of California, San Diego**, La Jolla, CA  
BENG 087: Freshman Seminar in Bioengineering (2012-2018); BENG 102: Molecular Components of Living Systems (2016, 2020); BENG 110: Continuum Biomechanics (2009); BENG 112B: Biomechanics II (2009–2017, 2019); BENG 140B: Physiology (2010); BENG 192: Senior Seminar in Bioengineering (2009, 2017); BENG193: Clinical Bioengineering (2014-2020); BENG 230B: Molecular and Cell Biology (2012–2020); BENG 241B: Tissue Engineering (2011, 2013, 2015, 2017); CMM 250: Stem Cell Biology (2009–2012; 2014-2019)
- **Princeton University**, Princeton, NJ  
Molecular Biology: Seminar in Stem Cell Biology (2007)
- **University of Pennsylvania**, Philadelphia, PA (Teaching Assistanceships)  
BE 200: Introduction to Biomechanics and Biomaterials (2004 - 2005), MEAM 247: Mechanics of Materials Laboratory (2003); MEAM 211: Dynamics (2002 - 2004)

### **JOURNAL SERVICE**

- Editorial Board Memberships: Public Library of Science One (*PLoS One*) (2012 – 2017), Cells Tissues Organs (2013 – 2017), APL Bioengineering (2017 – present)
- Ad hoc reviewer: Biophysical Journal (2007 – present), Journal of Biomechanics (2007 – present), Journal of Biological Chemistry (2009), Journal of Cell Science (2008 – present), Journal of Cell Biology (2009 – present), Molecular Biology of the Cell (2009 – present), Nature Materials (2009 – present), Proc Nat Acad Sci USA (2010 – present), Cell (2015 – present), Science (2015 – present), Nature Biomedical Engineering (2018 – present)

### **GRANT REVIEWER/STUDY SECTION SERVICE**

- Ad hoc reviewer: U.S. – Israel Binational Science Foundation (2008); Netherlands Organization for Scientific Research (2008 – 2009); New Jersey Commission on Cancer Research (2009 – 2010); Engineering and Physical Sciences Research Council (UK) (2009 – 2010); National Institutes of Health, Cardiovascular Sciences Study Section (2010), Cellular Aspects of Diabetes and Obesity Study Section (CADO; 2011), Early Independence Award Study Section (2012), Cardiac Contractility, Hypertrophy, and Failure Study Section (CCHF; 2016, 2017), Cancer Tissue Engineering (2017); National Science Foundation (2012 – present)
- Study section member: American Heart Association, Basic Cell-Regenerative Cell Biology 2 (RCB2) Study Section Member (2010 - 2016); National Institutes of Health, Cardiac Contractility, Hypertrophy, and Failure Study Section (CCHF; 2018-2020); National Institutes of Health, Therapeutic Development and Pre-Clinical Studies Study Section (TDPS; 2020-2022)

### **PROFESSIONAL SOCIETY SERVICE**

- Member, American Society of Cell Biology Project 50 (2007 – present)

- Speaker, California Institute of Regenerative Medicine Stem Cell Awareness Day, High Tech High; San Diego, CA (2009)
- Guest Editor, Special Issue on “Cell Mechanobiology,” Journal of Biomechanics (2010)
- Session Chair and Organizer, “New Materials to Regulate Stem Cells,” TERMIS 2<sup>nd</sup> World Congress (2009); “Controlling Microenvironment and Cell Fate,” TERMIS NA Meeting (2010)
- Program Committee Member, 5<sup>th</sup> Biennial American Society for Matrix Biology Meeting (2010)
- Session Chair and Organizer, “Bioengineering and Mechanobiology,” American Society for Cell Biology (2011)
- Track Chair, “Stem Cell Engineering,” Biomedical Engineering Society Meeting (2013)
- Guest Editor, Special Issue on “Mechanobiology,” Progress in Molecular Biology and Translational Science (2014)
- Council Member, American Society for Matrix Biology (2015-2018)
- Guest Editor, Special Issue on “Provisional Matrix,” Matrix Biology (2017)
- Track Chair, “Biomaterials,” Biomedical Engineering Society Meeting (2018)
- Nominations Committee, Tissue Engineering Regenerative Medicine International Society-Americas (2019-2021)
- Membership Committee, Biomedical Engineering Society (2019-Present; Chair, 2022-Present)
- Track Chair, “Tissue Engineering,” Biomedical Engineering Society Meeting (2020)