SANJAY KUMAR, M.D., Ph.D.
Chancellor's Professor
Director, California Institute for Quantitative Biosciences at
University of California, Berkeley (QB3-Berkeley)
Appointments in UC Berkeley Bioengineering (primary) & Chemical and Biomolecular Engineering,
UCSF Bioengineering and Therapeutic Sciences, and LBNL
274A Stanley Hall #1762, Department of Bioengineering, Berkeley, CA 94720-1762

EDUCATION AND TRAINING

University of Minnesota	Chemical Engineering	B.S., *summa cum laude*	1996
Johns Hopkins University	Molecular Biophysics	Ph.D.	2003
Johns Hopkins University	Medicine	M.D.	2003
Harvard Medical School & Children's Hospital Boston	Cancer & Cell Biology	Research Fellowship	2005

POSITIONS AND HONORS

Academic Appointments

2005-2011	Assistant Professor of Bioengineering, University of California, Berkeley.
2011-2014	Associate Professor of Bioengineering, University of California, Berkeley.
2014-	Professor of Bioengineering, University of California, Berkeley.
2015-	Professor of Chemical & Biomolecular Engineering, University of California, Berkeley.
2015-2019	Associate Chair, Department of Bioengineering, University of California, Berkeley.
2019-2022	Chair, Department of Bioengineering, University of California, Berkeley.
2019-	Chancellor's Professor, University of California, Berkeley.
2020-	Professor in Residence, Department of Bioengineering and Therapeutic Sciences, UCSF.
2022-	Director, California Institute for Quantitative Biosciences at UC Berkeley (QB3-Berkeley)

Other Positions

2006-	Faculty Scientist, Biological Systems & Engineering Division, Lawrence Berkeley National Laboratory.
2009-2014	Investigator, NCI Bay Area Physical Sciences and Oncology Center.
2011-2012	Co-Chair, UC Berkeley & UCSF Graduate Program in Bioengineering.
2012-2015	Chair, UC Berkeley & UCSF Graduate Program in Bioengineering.
2012-2013	Faculty Director, UC Berkeley & UCSF Master of Translational Medicine Program.
2014	Sackler Sabbatical Exchange Fellow, Brain Tumor Research Center, UCSF.
2014	Visiting Professor, Institute of Bioengineering (IBI) and Swiss Institute for Experimental Cancer. Research (ISREC), École Polytechnique Fédérale de Lausanne (EPFL), Switzerland.

Honors and Awards

1992-1996	National Merit Scholarship, University of Minnesota.
1995	Tau Beta Pi (National Engineering Honor Society).
1996-2003	NIH Medical Scientist Training Program Fellowship.
2000	First Place, Society for Experimental Biology and Medicine Graduate Student Research Forum.
2004-2005	National Research Service Award, National Institutes of Health (NINDS).
2004	Co-Winner, Poster Oral Presentation Contest and Travel Award, Gordon Research Conference on Intermediate Filaments.
2006-2009	Beckman Young Investigator Award, Arnold and Mabel Beckman Foundation.
2006	Selected for NAS/CAS Kavli Chinese-American Frontiers of Science Meeting (Irvine, CA).
2007-2008	Presidential Chair Teaching Fellow, UC Berkeley.

2008 Outstanding Graduate Advisor, UCSF/UCB Joint Graduate Group in Bioengineering.
2008 Hellman Faculty Award, UC Berkeley.
2008-2013 NIH Director's New Innovator Award.
2009 Outstanding Teaching Award (by student vote), UC Berkeley Bioengineering Honor Society.
2009 Kavli Fellow, NAS/CAS Kavli Chinese-American Frontiers of Science (Kunming, China).
2009-2014 Presidential Early Career Award for Scientists and Engineers (PECASE), White House Office of Science and Technology Policy & Army Research Office.
2009 Named to Top 10 Reviewers of the Year, *Cellular and Molecular Bioengineering*.
2010 Selected for NAE Frontiers of Enginerering Meeting (Armonk, NY).
2011 Rising Star Talk, BMES/SPRBM Meeting on Cellular and Molecular Bioengineering.
2011-2016 NSF CAREER Award.
2011 Selected for NAE Arab-American Frontiers of Science, Engineering and Medicine Meeting, Kuwait.
2012 *Stem Cells* Young Investigator Award.
2015 Fellow, American Institute for Medical and Biological Engineering (AIMBE).
2016 Fellow, Biomedical Engineering Society (BMES).
2016 Member, Faculty of 1000, Cell Biology/Cytoskeleton Section.
2020 Fellow, American Association for the Advancement of Science (AAAS).
2024 Addgene Blue Flame Award (>100 requests for a deposited plasmid)

Other Relevant Professional Experience

2009 External Advisory Board, MECHANO-CELL National Program Project, Spanish Ministry of Education.
2010-2017 External Advisory Board, UC Irvine-Beckman Laser Institute Laser Microbeam and Medical Program (LAMMP).
2011-2014 Standing Member, NSERC Discussion Group on Materials and Chemical Engineering.
2012 External Advisory Board, UCSF Tumor Microenvironment Network Brain Tumor U54.
2012-2022 Editorial Board, *PLoS ONE.*
2014 Visiting External Advisory Board, Translational Genomics Research Institute (TGen).
2015-2019 Standing Member, NIH/CSR Intercellular Interactions (ICI) Study Section.
2017-2021 Council Member, BMES Special Interest Group on Cellular and Molecular Bioengineering
2019 UC Berkley Faculty Leadership Academy, Office of the Executive Vice Chancellor & Provost.
2019 Scientific Advisory Board, Institute for Engineering in Medicine, University of Minnesota.
2019-2022 External Advisory Board Member, Department of Biomedical Engineering, UC Davis.
2021 External Review Committee, Bioengineering PhD Program, Georgia Tech
2021 External Review Committee, Department of Bioengineering, Stanford.
2022- External Advisory Board, MIT MetNet U54.
2022-2024 Board of Directors, Biomedical Engineering Society (BMES).
2024 Co-Chair, External Review Committee, Department of Bioengineering, UC San Diego.
2024 Chair, BMES Fellows Committee.
2024 External Review Committee, Department of Biomedical Engineering, Northwestern University

CONFERENCE ORGANIZATION, INVITED TALKS, AND SEMINARS

Conference Organization & Invited Talks (selected)

2006 Invited Speaker, Workshop on Multiscale Interactions and Dynamics in Biological Systems, ICAM/CCB, Washington University, St. Louis, MO, May 2006.
2006 Co-chair, Session on Cell Mechanics and Motility, Biophysical Society Annual Meeting, Salt Lake City, UT.
2006 Invited Speaker, Symposium on Biological Nanostructures, Materials, and Applications, Annual Meeting of the Electrochemical Society, Cancun, Mexico.

2007 Invited Speaker and Participant, Taiwan-US Workshop on Soft Materials, International Center for Materials Research, Taipei, Taiwan.
2007 Invited Speaker and Participant, International Nanotribology Forum, Hoi An, Vietnam.
2007 Invited Speaker, American Institute of Chemical Engineers National Meeting, Salt Lake City, UT.
2008 Conference Chair and Co-Organizer, AFM Biomed Meeting, Monterey, CA.
2008 Invited Speaker, Accelerate Brain Cancer Cure (ABC Squared) Meeting, Washington, DC.
2009 Invited Speaker and Participant, Advanced Optical Methods Workshop, Molecular Imaging Center, UC Berkeley.
2009 Invited Speaker, IEEE-EMBS Meeting, Minneapolis, MN.
2009 Co-Chair, Session on Biomechanical Signaling in Stem Cell Engineering, Biomedical Engineering Society Meeting, Pittsburgh, PA.
2010 Invited Speaker and Participant, Workshop on The Mechanical Properties of Cancer Cells and their Microenvironment, Beyond Center, Arizona State University, Tempe, AZ, February 2010.
2010 Invited Speaker, SBE International Conference on Stem Cell Engineering, Boston, MA, May 2010.
2010 Invited Speaker and Member of the Scientific Committee, AFM Biomed Meeting, Rovinj, Croatia, May 2010.
2010 Invited Speaker, Workshop on Glioblastoma Multiforme, San Sebastian, Spain, June 2010.
2010 Invited Speaker, World Congress of Biomechanics, Singapore, August 2010.
2011 Invited Speaker, Workshop on NanoBio Imaging, Korea Research Institute of Standards and Science, June 2011.
2011 NSF Workshop on Biologically Enabled Wireless Networks, Arlington, VA, July 2011.
2011 Member of Organizing Committee, AFM Biomed Meeting, Paris, France, August 2011.
2011 Invited Speaker, COST Action TD1002 (AFM4NanoMed&Bio), Paris, France, August 2011.
2012 Keynote Speaker University of Wisconsin Laboratory for Optical and Computational Instrumentation (LOCI) Workshop on Optical Applications for Bioengineering, June 2012.
2012 Member of Organizing Committee, AIChE/SBE International Conference on Bioengineering and Nanotechnology, Berkeley, CA, June 2012.
2012 Invited Speaker, Materials Research Society Annual Meeting, Symposium on Mechanobiology of Cells and Materials, April 2012.
2012 Invited Speaker and Pre-Course Instructor, European Society for Biomechanics Meeting, Lisbon, Portugal, July 2012.
2012 Invited Speaker, Society for Biomaterials Meeting, New Orleans, LA, October 2012.
2012 Stanford Bay Area Mechanobiology (BAM-B) Symposium, November 2012.
2013 Invited Speaker, BMES CMBE Conference, Kona, HI, January 2013.
2013 Member of Organizing Committee, AFM Biomed Meeting, Shanghai, China, May 2013.
2013 Invited Speaker, NSF International Conference on Stem Cell Differentiation: The Influence of Biomaterials and Biomechanics. Shanghai, China, June 2013.
2014 Invited Speaker, German Physical Society (DPG) Spring Meeting, Dresden, Germany, March/April 2014.
2014 Invited Speaker (2) FASEB Annual Meeting (EB2014), San Diego, CA, April 2014.
2014 Invited Speaker, International Workshop on Multiscale Mechanobiology, Hong Kong, May 2014.
2014 Invited Speaker (2), World Congress of Biomechanics, Boston, MA, July 2014.
2014 Invited Speaker, GRC on Signal Transduction by Engineered Extracellular Matrices, July 2014.
2014 3rd International Conference on Bioinspired and Biobased Chemistry and Materials (Keynote), Nice, October 2014.
2015 Keynote Speaker, ASME 4th Global Congress on Nanoengineering for Medicine and Biology (NEMB), Minneapolis, MN, April 2015.
2015 NSF-Columbia MechanoMedicine Workshop, New York, NY, April 2015.
2015 Invited Speaker, Biophysical Society Thematic Meeting, New Biological Frontiers Illuminated by Molecular Sensors and Actuators, Taipei, Taiwan, June 2015.

2015 Invited Speaker, Conference on Hierarchical Dynamics in Soft Materials and Biological Matter, Kyoto University/iCeMS, Japan, September 2015.
2015 Keynote Speaker, American Vacuum Society International Symposium & Exhibition, San Jose, CA, October 2015.
2015 Invited Speaker & Discussion Leader, Workshop on Cell/Matrix Mechanobiology – Current State and Future Directions, University of Illinois, Urbana-Champaign, October 2015.
2016 Invited Speaker, AACR Special Conference on Engineering and Physical Sciences in Oncology, Boston, MA, June 2016.
2016 Invited Speaker, ARO/NSF/SRC Hybrid Semiconductor-Biological Systems Meeting, Georgia Tech, Atlanta, GA, July 2016.
2016 Participant and Invited Speaker, Workshop on Modeling and Quantifying Cell Function: 25 years of Cell Mechanobiology, Banff International Research Station, Canada, October 2016 (planned).
2016 Keynote Lecture, AIChE Annual Meeting, San Francisco, CA, September 2016.
2017 Invited Speaker, BMES CMBE Conference, Kona, HI, January 2017.
2018 Invited Speaker, Theodore von Kármán Discussion Conference on Materials for Life, Bensberg, Germany, April 2018.
2018 Invited Speaker, Modeling Cell Mechanics in Cancer Workshop, University of Minnesota Physical Sciences in Oncology Center, May 2018.
2018 Invited Speaker, Minnesota Neuro-Oncology Symposium, May 2018.
2018 Organizing Committee, AIChE/SBE International Conference on Stem Cell Engineering, December 2018.
2018 Keynote Speaker (2), World Congress of Biomechanics, Dublin, Ireland, July 2018.
2019 Invited Speaker, GRC on Signal Transduction by Engineered Extracellular Matrices, July 2018.
2019 Invited Speaker, BMES CMBE Conference, San Diego, CA, January 2019.
2019 Invited Speaker, GRC on Physical Sciences and Cancer, Galveston, TX, February 2019.
2019 Invited Speaker, Telluride Workshop on Intrinsically Disordered Proteins, July 2019.
2019 Invited Speaker, DOE Molecular Foundry Users Meeting, August 2019.
2019 University of Florida Soft Matter Symposium, October 2019.
2019 DOE Molecular Foundry Users Meeting, Berkeley, CA, August 2019.
2020 Invited Speaker, Physics of Cancer Symposium, University of Leipzig, September 2020.
2020 Invited Speaker, Indian Academy of Sciences Frontiers of Science Symposium on Materials for Society, October 2020.
2021 Invited Speaker, University of Virginia Center for Advanced Biomanufacturing, March 2021.
2022 Invited Speaker, GRC on Intermediate Filaments, June 2022.
2022 Invited Speaker, GRC on Signaling by Adhesion Receptors, June 2022.
2022 Keynote Speaker, UC Systemwide Bioengineering Conference, August 2022.
2022 Keynote Speaker, Society for Engineering Science, October 2022.
2023 Invited Speaker, GRC on Basic Mechanisms to Clinical Trials in Brain Tumors, June 2023.
2023 Invited Speaker, MBI Mechanobiology in Health and Disease Workshop, National University of Singapore, September 2023.
2024 University of Pennsylvania Center for Engineering MechanoBiology (CEMB) Symposium on Mechanobiology and Mechanointelligence, March 2024.
2024 Invited Speaker, Cold Spring Harbor Laboratory Course on Brain Tumors, June 2024.
2024 Calico Mechanosensation Minisymposium, Calico Life Sciences, July 2023 (planned).
2024 Chair, GRC on Signal Transduction by Engineered Extracellular Matrices (Vice Chair, 2022).
2024 Keynote Speaker, Boston University Center for Multiscale and Translational Mechanobiology Annual Symposium, November 2024 (planned).

<u>Full Seminars (selected; *cancelled or postponed due to COVID-19)</u>
University of California, San Francisco, Department of Ophthalmology, San Francisco, CA, November 2005.
University of California, Berkeley, Nanoscale Science and Engineering Group, Berkeley, CA, February 2006.

University of Illinois at Chicago, Department of Physiology and Biophysics, Chicago, IL, October 2006.
Industrial Technology Research Institute (ITRI), Biomedical Engineering Laboratory, Hsinchu, Taiwan, January 2007.
University of California, San Francisco, Department of Neurological Surgery Grand Rounds, San Francisco, CA, January 2007.
University of California, Davis, Department of Biomedical Engineering, November 2007.
Rice University, Department of Bioengineering, April 2008.
Carnegie Mellon University, Department of Biomedical Engineering, Spring 2008.
University of Navarra, Pamplona, Spain, July 2008.
Texas Instruments, Dallas, TX, September 2008.
University of California, Irvine, Department of Bioengineering, January 2009.
University of California, San Diego, Department of Bioengineering, February 2009.
Mathematical Biosciences Institute, Ohio State University, March 2009.
Korea Research Institute of Standards and Science (KRISS), March 2009.
Peking University, China, March 2009.
Columbia University, Department of Chemical Engineering, May 2009.
University of Zaragoza, Zaragoza, Spain, July 2009.
University of California, Berkeley, Department of Chemical Engineering, Fall 2009.
Brigham Young University, Department of Mathematics, September 2009.
University of Florida, Department of Biomedical Engineering, November 2009.
University of California, Berkeley, Nano Seminar Series, November 2009.
Stanford University Departments of Bioengineering and Materials Science & Engineering, January 2010.
Penner Biomechanics Seminar, University of California, San Diego, Department of Mechanical and Aeronautical Engineering, February 2010.
Illinois Institute of Technology, Department of Chemical and Biological Engineering, March 2010.
University of Chicago, Department of Surgery, March 2010.
University of Pittsburgh, Department of Bioengineering, Pittsburgh, PA, March 2010.
University of Southern California, Physical Sciences-Oncology Center, August 2010.
Washington University in St. Louis, Department of Biomedical Engineering, December 2010.
Harvard University School of Engineering and Applied Sciences (by graduate student invitation), March 2011.
Harvard-MIT Health Sciences and Technology Program, March 2011.
Yale University, Department of Biomedical Engineering, May 2011.
Catalonian Institute for Bioengineering (IBEC), Barcelona, Spain, June 2011.
University of Illinois at Urbana-Champaign, Department of Mechanical Science and Engineering, October 2011.
National Centre for Biological Sciences (NCBS) and Institute for Stem Cell Biology and Regenerative Medicine (inSTEM), Bangalore, India, December 2011.
Indian Institute of Science, Department of Mechanical Engineering, Bangalore, India, December 2011.
Lecture at the Leading Edge, Department of Chemical Engineering and Applied Chemistry, University of Toronto, January 2012.
Arizona State University, Physical Sciences-Oncology Center, March 2012.
Cornell University, Department of Chemical and Biomolecular Engineering, March 2012.
University of South Florida, Department of Physics, October 2012.
Texas A&M Health Sciences, Department of Systems Biology & Translational Medicine, December 2012.
Berkeley Nanosciences and Nanoengineering Institute, April 2013.
Stanford University Department of Bioengineering, April 2013.
Catalonian Institute for Bioengineering (IBEC), Barcelona, Spain, June 2013.
EPFL Institute of Bioengineering, Lausanne, Switzerland, June 2013.
Department of Bioengineering, University of California, Berkeley, September 2013.
Institut Curie, Paris, France, November 2013.
CEA/CNRS Grenoble, France, November 2013.
UCSF Diller Cancer Center, San Francisco, July 2014.

University College Dublin, Conway Institute, Dublin, Ireland, October 2014. Technical
University of Dresden, Green Seminar, Germany, October 2014.
University of Heidelberg, BioQuant Seminar, October 2014.
Biozentrum, University of Basel, October 2014.
Max Planck Institute (MPI) for Cell Biology, Martinsried, October 2014.
Technical University of Munich, Germany, November 2014.
Iowa State University, Department of Chemical and Biomolecular Engineering, January 2015.
University of Maryland, Department of Bioengineering, February 2015.
University of Montreal, Faculty of Pharmacy, May 2015.
University of Pennsylvania, Department of Bioengineering, January 2016.
University of Texas at Austin, Department of Biomedical Engineering, January 2016.
Duke University, Department of Biomedical Engineering, March 2016.
University of Massachusetts-Amherst, Department of Chemical Engineering, April 2016.
Washington University in St. Louis, Department of Mechanical Eng. and Materials Sci., April 2017.
University of Minnesota, Department of Biomedical Engineering, April 2017.
University of Washington, Molecular Engineering and Sciences Institute, May 2017.
Wayne State University, Nano@Wayne Series, March 2018.
Rice University, Department of Bioengineering, October 2018.
MIT Biophysics Seminar Series, May 2019.
Oklahoma Center for Adult Stem Cell Research, May 2019.
Elkin Lecture Series, Emory School of Medicine, September 2019.
Purdue University, School of Biomedical Engineering Distinguished Speaker, October 2019.
University of California, Davis, Department of Biomedical Engineering Distinguished Speaker, December 2019.
University of Washington, Department of Chemical Engineering, April 2020.*
Université Laval, Cancer Research Center, May 2020.*
University of Pittsburgh, Department of Biomedical Engineering, October 2020.
University of Alabama Birmingham, Department of Biomedical Engineering, October 2020.
University of California, Riverside, Department of Bioengineering, October 2020.
University of California, Irvine, Department of Biomedical Engineering, February 2021.
Colorado State University, School of Biomedical Engineering, February 2021.
St. Louis University School of Medicine, April 2022.
South Dakota School of Mines, Department of Chemical Engineering, April 2022.
Mt. Sinai School of Medicine, Friedman Brain Institute, May 2022.
University of Colorado, Boulder, Department of Biomedical Engineering, September 2022.
Texas A&M University, Department of Biomedical Engineering, October 2022.
Case Western University, Department of Biomedical Engineering, March 2023.
University of Virginia, Department of Biomedical Engineering, April 2023.
Stanford University, Department of Bioengineering, April 2024.
Georgia Tech/Emory Department of Biomedical Engineering, April 2024.
University of Southern California, Department of Biomedical Engineering, October 2024.
University of Notre Dame, Department of Aerospace and Mechanical Engineering, November 2024.

PUBLICATIONS

Journal Publications (*co-first author; **co-corresponding author)

1. J. Schneider, P. Berndt, K. Haverstick, S. Kumar, S. Chiruvolu, and M. Tirrell **(1998)**. Force and adhesion measurements between hydrogen-bonded layers of glycine-functionalized amphiphiles. ***Journal of the American Chemical Society*** 120: 3508-3509.
2. S. Kumar and J. H. Hoh **(2000)**. Direct visualization of vesicle-bilayer complexes by atomic force microscopy. ***Langmuir*** 16: 9936-9940.
3. S. Kumar and J. H. Hoh **(2001)**. Probing the machinery of intracellular trafficking with the atomic force microscope. ***Traffic*** 2: 746-756.

4. S. Kumar, X. Yin, B. D. Trapp, J. H. Hoh, and M. E. Paulaitis **(2002)**. Relating interactions between neurofilaments to the structure of axonal neurofilament distributions through polymer brush models. ***Biophysical Journal*** 82: 2360-2372.
5. J. Schneider, P. Berndt, K. Haverstick, S. Kumar, S. Chiruvolu, and M. Tirrell **(2002)**. Surface force measurements of electrostatic and hydrogen-bonding interactions between bilayers of glycine amphiphiles. ***Langmuir*** 18: 3923-3931.
6. S. Kumar, X. Yin, B. D. Trapp, M. E. Paulaitis, and J. H. Hoh **(2002)**. Role of long-range repulsive forces in organizing axonal neurofilament distributions: Evidence from mice deficient in myelin-associated glycoprotein. ***Journal of Neuroscience Research*** 68: 681-690.
7. R. Mukhopadhyay, S. Kumar, and J. H. Hoh **(2004)**. Molecular mechanisms for organizing the neuronal cytoskeleton. ***BioEssays*** 26: 1017-1025.
8. S. Kumar and J. H. Hoh. Modulation of repulsive forces between neurofilaments by sidearm phosphorylation **(2004)**. ***Biochemical and Biophysical Research Communications*** 324: 489-496.
9. A. Heisterkamp, I. Z. Maxwell, E. Mazur, J. M. Underwood, J. A. Nickerson, S. Kumar, and D. E. Ingber **(2005)**. Pulse energy-dependence of subcellular ablation by femtosecond laser pulses. ***Optics Express*** 13: 3690-3696.
10. T. P. Lele, J. Pendse, S. Kumar, M. Salanga, J. Karavitis, and D. E. Ingber **(2006)**. Mechanical forcedependent changes in the unbinding kinetics of zyxin within focal adhesions in living cells. ***Journal of Cellular Physiology*** 207: 187-194.
11. S. Kumar, I. Z. Maxwell, A. Heisterkamp, T. R. Polte, T. P. Lele, M. Salanga, E. Mazur, and D. E. Ingber **(2006)**. Viscoelastic retraction of single living stress fibers and its impact on cell shape, cytoskeletal organization and extracellular matrix mechanics. ***Biophysical Journal*** 90: 3762-3773.
12. C. P. Brangwynne, F. C. MacKintosh, S. Kumar, N. A. Geisse, J. Talbot, L. Mahadevan, K. K. Parker, D. E. Ingber, and D. A. Weitz **(2006)**. Microtubules can bear enhanced compressive loads in living cells because of lateral reinforcement. ***Journal of Cell Biology*** 173: 733-741.
13. T. P. Lele and S. Kumar **(2007)**. Brushes, cables, and anchors: Recent insights into multiscale assembly and mechanics of cellular structural networks. ***Cell Biochemistry and Biophysics*** 47: 348-360.
14. M. G. Chown and S. Kumar **(2007)**. Imaging and manipulating the structural machinery of living cells on the micro- and nanoscale. ***International Journal of Nanomedicine*** 2: 1-12.
15. S. Kumar and P. R. Leduc **(2007)**. Dissecting the molecular basis of the mechanics of living cells. *Experimental Mechanics* 49: 11-23 [published online August 10, 2007; appeared in February 2009 issue].
16. R. J. Mannix*, S. Kumar*, F. Cassiola, M. Montoya-Zavala, E. Feinstein, M. Prentiss, and D. E. Ingber **(2008)**. Nanomagnetic actuation of receptor-mediated signal transduction. ***Nature Nanotechnology*** 3: 36-40 [*equal contribution].
17. R. G. Thakar, M. Chown, A. Patel, S. Kumar*, and T. A. Desai* **(2008)**. Contractility-dependent modulation of cell proliferation and adhesion by microscale topographical cues. ***Small*** 4: 1416-1424 [*cocorresponding authors]
18. Y. Luo, X. Xu, T. P. Lele, S. Kumar, and D. E. Ingber **(2008)**. A multimodular tensegrity model of an actin stress fiber. ***Journal of Biomechanics*** 41: 2379-2387.
19. S. Kumar and V. M. Weaver **(2009)**. Mechanics, malignancy, and metastasis: The force journey of a tumor cell. ***Cancer and Metastasis Reviews*** 28: 113-127.
20. T. A. Ulrich, E. M. De Juan Pardo, and S. Kumar **(2009)**. The mechanical rigidity of the extracellular matrix regulates the structure, motility, and proliferation of glioma cells. ***Cancer Research*** 69: 4167-4174.
21. S. Sen and S. Kumar **(2009)**. Cell-matrix de-adhesion dynamics reflect contractile mechanics. ***Cellular and Molecular Bioengineering*** 2: 218-230.
22. D. J. D'Sa, E. M. De Juan Pardo, R. Rivas-Astiz, S. Sen, and S. Kumar **(2009)**. High-throughput indentational elasticity measurements of hydrogel extracellular matrix substrates. ***Applied Physics Letters*** 95: 63701 1-3.
23. S. Sen and S. Kumar **(2009)**. Isoform-specfic contributions of a-actinin to glioma cell mechanobiology. ***PLoS ONE*** 4: e8427.

24. A. J. Keung, K. E. Healy, S. Kumar, and D. V. Schaffer **(2010)**. Biophysics and dynamics of natural and engineered stem cell microenvironments. ***Wiley Interdisciplinary Reviews (WIREs)– Systems Biology and Medicine*** 2: 49-64.
25. S. Sen and S. Kumar **(2010)**. Combining mechanical and optical approaches to dissect cellular mechanobiology. ***Journal of Biomechanics*** 43: 45-54.
26. T. A. Ulrich, A. Jain, K. Tanner, J. L. MacKay, and S. Kumar **(2010)**. Probing cellular mechanobiology with collagen-agarose matrices. ***Biomaterials*** 31: 1875-1884.
27. A. Patel, R. G. Thakar, M. Chown, P. Ayala, T. A. Desai, and S. Kumar **(2010)**. Biophysical regulation of single cell interactions with microtopographical cues. ***Biomedical Microdevices*** 12: 287-296.
28. W. A. Lam, L. Cao, V. Umesh, A. J. Keung, S. Sen, and S. Kumar **(2010)**. Extracellular matrix rigidity modulates neuroblastoma cell differentiation and N-Myc expression. ***Molecular Cancer*** 9: 35.
29. A. J. Keung, S. Kumar, and D. V. Schaffer **(2010)**. Presentation counts: Mechanical and material regulation of stem cell biology. ***Annual Review of Cell and Developmental Biology*** 23: 533-556.
30. K. Tanner, A. K. Boudreau, M. J. Bissell, and S. Kumar **(2010)**. Dissecting regional variations in stress fiber mechanics with laser nanosurgery. ***Biophysical Journal*** 99: 2775-2783.
31. J. Lee, B. H. Chu, S. Sen, A. Gupte, T. J. Chancellor, C.-Y. Chang, F. Ren, S. Kumar, and T. P. Lele **(2011)**. Modulating malignant epithelial tumor cell adhesion, migration, and mechanics with nanorod surfaces. ***Biomedical Microdevices*** 13: 89-95.
32. S. Sen, W. P. Ng, and S. Kumar **(2011)**. Contractility dominates adhesive ligand density in regulating cellular de-adhesion and retraction dynamics. ***Annals of Biomedical Engineering*** 39: 1163-1173.
33. A. Pathak and S. Kumar **(2011)**. Biophysical regulation of tumor cell invasion: Moving beyond matrix stiffness. ***Integrative Biology*** 3: 267-278.
34. A. Pathak and S. Kumar **(2011)**. From molecular signal activation to locomotion: An integrated, multiscale analysis of cell motility on defined matrices. ***PLoS ONE*** 6: 18423 (11 pages).
35. T. A. Ulrich, T. Lee, H. Shon, D. Moon, and S. Kumar **(2011)**. Microscale mechanisms of agarose-induced disruption of collagen remodeling. ***Biomaterials*** 32: 5633-5642.
36. B. Ananthanarayanan, Y. Kim, and S. Kumar **(2011)**. Elucidating the mechanobiology of malignant brain tumors using a brain matrix-mimetic hyaluronic acid hydrogel platform. ***Biomaterials*** 32: 7913-7923.
37. A. A. Patel, T. A. Desai, and S. Kumar **(2011)**. Microtopographical assembly of cardiomyocytes. ***Integrative Biology*** 3: 1011-1019.
38. A. J. Keung, E. M. de Juan Pardo, D. V. Schaffer, and S. Kumar **(2011)**. Rho GTPases mediate the mechanosensitive lineage commitment of neural stem cells. ***Stem Cells*** 29: 1886-1897.
39. J. L. MacKay, A. J. Keung, and S. Kumar **(2012)**. A genetic strategy for the dynamic and graded control of cell mechanics, motility, and matrix remodeling. ***Biophysical Journal*** 102: 434-442.
40. N. Srinivasan and S. Kumar **(2012)**. Ordered and disordered proteins as nanomaterial building blocks. ***Wiley Interdisciplinary Reviews (WIREs)– Nanomedicine and Nanobiotechnology*** 4: 204-218.
41. S. Sen, W. P. Ng, and S. Kumar **(2012)**. Contributions of talin-1 to glioma cell-matrix tensional homeostasis. ***Journal of the Royal Society Interface*** 9: 1311-1317.
42. A. Pathak and S. Kumar **(2012)**. Independent regulation of tumor cell migration by matrix stiffness and confinement. ***Proceedings of the National Academy of Sciences (PNAS)*** 109: 10334-10439.
43. A. J. Keung, P. Asuri, S. Kumar,* and D. V. Schaffer* **(2012).** Soft microenvironments promote the early neurogenic differentiation but not self-renewal of human pluripotent stem cells. ***Integrative Biology*** 4: 1049-1058 [*co-corresponding authors].
44. G. Brown et al. **(2012)**. Cellular and molecular bioengineering: A tipping point. ***Cellular and Molecular Bioengineering*** 5: 239-253.
45. J. L. MacKay and S. Kumar **(2013)**. Measuring the elastic properties of living cells with atomic force microscopy indentation. ***Methods in Molecular Biology*** 931: 313-329.
46. S. Kumar **(2013).** Microtubule assembly: Switched on with magnets. ***Nature Nanotechnology*** 8: 162163.
47. C.-W. Chang and S. Kumar **(2013)**. Vinculin tension distributions of individual stress fibers within cellmatrix adhesions. ***Journal of Cell Science*** 126: 3021-3030.

48. A. J. Keung, M. Dong, D. V. Schaffer, and S. Kumar **(2013).** Pan-neuronal maturation but not neuronal subtype differentiation of adult neural stem cells is mechanosensitive. ***Scientific Reports*** 3: 1817 (6 pages).
49. A. Pathak and S. Kumar **(2013)**. Transforming potential and matrix stiffness co-regulate confinement sensitivity of tumor cell migration. ***Integrative Biology*** 5: 1067-1075.
50. A. P. Acharya, P.Nafisi, A.Gardner, J. L. MacKay, K. Kundu, S. Kumar, and N. Murthy **(2013)**. A fluorescent peroxidase probe increases the sensitivity of commercial ELISAs by two orders of magnitude. ***Chemical Communications*** 49: 10379-10381.
51. K. Kurpinski, T. Johnson, S. Kumar, T. A. Desai, S. Li **(2013)**. Mastering translational medicine: Interdisciplinary education for a new generation. ***Science Translational Medicine*** 6: 218fs2.
52. J. L. MacKay, A. Sood, and S. Kumar **(2014)**. Three-dimensional patterning of multiple cell populations through orthogonal genetic control of cell motility. ***Soft Matter*** 10: 2372-2380.
53. F. A. Pelissier, J. C. Garbe, B. Ananthanarayanan, M. Miyano, C. Lin, T. Jokela, S. Kumar, M. R. Stampfer, J. B. Lorens, and M. A. LaBarge **(2014)**. Aging alters mechano-regulated differentiation of human mammary progenitors by Rho and Hippo pathways. ***Cell Reports*** 7: 1926-1939.
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