

BIOGRAPHICAL SKETCH

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NAME Celeste M. Nelson	POSITION TITLE Assistant Professor		
eRA COMMONS USER NAME (credential, e.g., agency login) cmnelson			
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	MM/YY	FIELD OF STUDY
Massachusetts Institute of Technology	S.B.	1994-1998	Biology
Massachusetts Institute of Technology	S.B.	1994-1998	Chemical Engineering
Johns Hopkins University, School of Medicine	Ph.D.	1998-2003	Biomedical Engineering
Lawrence Berkeley National Laboratory	Postdoc	2003-2007	Cancer Biology
Woods Hole Marine Biological Laboratory		2007	Embryology

Positions and Honors

Positions:

1995-1998 Research Assistant for Douglas A. Lauffenburger
 Chemical Engineering, Massachusetts Institute of Technology

1999-2003 Research Assistant for Christopher S. Chen
 Biomedical Engineering, Johns Hopkins University School of Medicine

2003-2007 Postdoctoral Fellow with Mina J. Bissell
 Life Sciences Division, Lawrence Berkeley National Laboratory

2007- Assistant Professor, Chemical & Biological Engineering, Princeton University

2008- Associated Faculty, Molecular Biology, Princeton University

2008- Member, Cancer Institute of New Jersey

2010- Visiting Research Assistant Professor, Biomedical Engineering, Boston University

Honors:

1995-1998 Edward Abdun-Nur Memorial Fellowship

1997-1998 Biotechnology Process Engineering Center Research Fellowship

1997-1998 Amoco Foundation Fellowship

1997-1998 Cunningham Memorial Fellowship

1997 Elected to Tau Beta Pi National Engineering Honor Society

1998 Elected to Phi Beta Kappa

1999 National Science Foundation Graduate Fellowship (declined)

1999-2003 Whitaker Foundation Graduate Fellowship

2004 Ruth L. Kirschstein National Research Service Award Postdoctoral Fellowship (declined)

2004-2007 DOD Breast Cancer Research Program Postdoctoral Fellowship

2007 LBNL Outstanding Performance Award

2007- Burroughs Wellcome Fund Career Award at the Scientific Interface

2008- David & Lucile Packard Foundation Fellowship

2009 E. Lawrence Keyes, Jr./Emerson Electric Co. Faculty Advancement Award

2009 Princeton Engineering Commendation for Outstanding Teaching

2010- Alfred P. Sloan Fellowship in Molecular Biology

2010 Technology Review TR35

Publications

1. Asthagiri A.R., Nelson C.M., Horwitz A.F., Lauffenburger D.A. (1999) Quantitative relation between integrin-ligand binding, adhesion, and signaling via focal adhesion kinase (FAK) and extracellular-signal regulated kinase 2 (ERK2). *J. Biol. Chem.* 274: 27119-27127.
2. Tien J., Nelson C.M., Chen C.S. (2002) Fabrication of aligned microstructures with a single elastomeric stamp. *Proc. Nat. Acad. Sci. U.S.A.* 99: 1758-1762.
3. Nelson C.M., Chen C.S. (2002) Cell-cell contact positively regulates cell proliferation via a PI3K-dependent mechanism. *FEBS Letters.* 514: 238-242.
4. Tan J.L., Nelson C.M., Gray D.S., Chen C.S. (2002) Approaches to organize cells on surfaces. *IEEE Engineering in Medicine and Biology Magazine*, 101-103.
5. Nelson C.M., Raghavan S., Tan J.L., Chen C.S. (2003) Degradation of micropatterned surfaces by cell-dependent and -independent processes. *Langmuir.* 19: 1493-1499.
6. Nelson C.M., Chen C.S. (2003) Engineering cell adhesion for biotechnology applications. *Chem. Eng. Tech.*, in press.
7. Nelson C.M., Chen C.S. (2003) VE-cadherin simultaneously stimulates and inhibits cell proliferation by altering cytoskeletal structure and tension. *J. Cell Sci.* 116: 3571-3581.
8. McBeath R., Pirone D.M., Nelson C.M., Bhadriraju K., Chen C.S. (2004) Cell shape, cytoskeletal tension, and RhoA regulate stem cell lineage commitment. *Dev. Cell.* 6: 483-495.
9. Nelson C.M., Pirone D.M., Tan J.L., Chen C.S. (2004) Vascular endothelial-cadherin regulates cytoskeletal tension, cell spreading, and focal adhesions by stimulating RhoA. *Mol. Biol. Cell.* 15: 2943-2953.
10. Tan J.L., Liu W., Nelson C.M., Raghavan S., Chen C.S. (2004) Simple approach to micropattern cells on common culture substrates by tuning substrate wettability. *Tissue Eng.* 10: 865-872.
11. Alcaraz J., Nelson C.M., Bissell M.J. (2004) Biomechanical approaches for studying integration of tissue structure and function in mammary epithelia. *J. Mammary Gland Biol. Neoplasia.* 9: 361-374.
12. Nelson C.M., Bissell M.J. (2005) Modeling dynamic reciprocity: Engineering three-dimensional culture models of breast architecture, function, and neoplastic transformation. *Semin. Cancer Biol.* 15: 342-352.
13. Radisky D.C., Levy D.D., Littlepage L.E., Liu H., Nelson C.M., Fata J.E., Leake D., Godden E.L., Albertson D.G., Nieto M.A., Werb Z., Bissell M.J. (2005) Rac1b and reactive oxygen species mediate MMP3-induced EMT and genomic instability. *Nature.* 436: 123-127.
14. Nelson C.M., Jean R.P., Tan J.L., Liu W.F., Sniadecki N.J., Spector A.A., Chen C.S. (2005) Emergent patterns of growth controlled by multicellular form and mechanics. *Proc. Nat. Acad. Sci. U.S.A.* 102: 11594-11599.
15. Nelson C.M., Liu W.F., Chen C.S. (2006) Analysis of cell-cell adhesion by bowtie-shaped microwells. *Adhesion Protein Protocols (Methods in Molecular Biology, Vol. 96).* 1-10.
16. Liu H., Radisky D.C., Nelson C.M., Zhang H., Fata J.E., Roth R.A., Bissell M.J. (2006) Mechanism of Akt1 inhibition of breast cancer cell invasion reveals a protumorigenic role for TSC2, *Proc. Natl. Acad. Sci. USA.*, 103: 4134-4139.
17. Kenny P.A., Nelson C.M., Bissell M.J. (2006) The ecology of tumors. *The Scientist*, April 2006: 30-37.
18. Nelson C. M., Bissell M.J. (2006) Of extracellular matrix, scaffolds, and signaling: Tissue architecture regulates development, homeostasis, and cancer. *Annu. Rev. Cell Dev. Biol.*, 22: 287-309.
19. Liu W. F., Nelson C.M., Pirone D.M., Chen C.S. (2006) E-cadherin engagement stimulates proliferation via Rac1. *J. Cell Biol.*, 173: 431-41.
20. Nelson C.M., Tien J. (2006) Microstructured extracellular matrices in tissue engineering and development. *Curr. Opin. Biotech.*, 17: 518-523.
21. Nelson C.M., VanDuijn M.M., Inman J.L., Fletcher D.A., Bissell M.J. (2006) Tissue geometry determines sites of mammary branching morphogenesis in organotypic cultures. *Science*, 314: 298-300.
22. Itoh M., Nelson C.M., Myers C.A., Bissell M.J. (2007) Rap1 integrates tissue polarity, lumen formation, and tumorigenic potential in human breast epithelial cells. *Cancer Res.*, 67: 4759-4766.

23. LeBeyec J., Xu R., Moonlee S.-Y., Nelson C.M., Rizki A., Alcaraz J., Bissell M.J. (2007) Cell shape regulates global histone acetylation in human mammary epithelial cells. *Exp. Cell Res.*, 313: 3066-3075.
24. Hirai Y., Nelson C.M., Yamazaki K., Takebe K., Przybylo J., Madden B., Radisky D.C. (2007) The non-classical export of epimorphin and its adhesion to α v-integrin for regulation of epithelial morphogenesis, *J. Cell Sci.*, 120: 2032-2043.
25. Liu W.F., Nelson C.M., Tan J.L., Chen C.S. (2007) Cadherins, RhoA, and Rac1 are differentially required for stretch-mediated proliferation in endothelial versus smooth muscle cells. *Circ. Res.*, 101: e44-52.
26. Nelson C.M., Inman J.L., Bissell M.J. (2008) Three-dimensional lithographically-defined organotypic tissue arrays for quantitative analysis of morphogenesis and neoplastic progression. *Nat. Protoc.*, 3: 674-678.
27. Nelson C.M., Khauv D., Bissell M.J., Radisky D.C. (2008) Change in cell shape is required for matrix metalloproteinase-induced epithelial-mesenchymal transition of mammary epithelial cells. *J. Cell. Biochem.*, 105: 25-33.
28. Gray D.S., Liu W.F., Shen C.J., Bhadriraju K., Nelson C.M., Chen C.S. (2008) Engineering amount of cell-cell contact demonstrates biphasic proliferative regulation through RhoA and the actin cytoskeleton. *Exp. Cell Res.*, 314: 2846-2854.
29. Alcaraz J., Xu R., Mori H., Nelson C.M., Mroue R., Spencer V.A., Brownfield D., Radisky D.C., Bustamante C., Bissell M.J. (2008) Laminin and biomimetic extracellular elasticity enhance functional differentiation in mammary epithelia. *EMBO J.*, 27: 2829-2838.
30. Xu R., Nelson C.M., Muschler J.L., Vonderhaar B.K., Bissell M.J. (2008) Sustained activation of STAT5 is essential for chromatin remodeling and maintenance of mammary-specific function. *J. Cell Biol.*, 184: 57-66.
31. LaBarge M.A., Nelson C.M., Viladsen R., Fridriksdottir A., Ruth J.R., Stampfer M.R. Petersen O.W., Bissell M.J. (2009) Human mammary progenitor cell fate decisions are products of interactions with combinatorial microenvironments. *Integr. Biol.*, 1: 70-79.
32. Nelson C.M. (2009) Geometric control of tissue morphogenesis. *Biochim. Biophys. Acta*, 1793: 903-910.
33. Chen C.S., Nelson C.M., Khauv D., Bennett S., Radisky E.S., Hirai Y., Bissell M.J., Radisky D.C. (2009) Homology with vesicle fusion mediator syntaxin-1a predicts determinants of epimorphin/syntaxin-2 function in mammary epithelial morphogenesis. *J. Biol. Chem.*, 284: 6877-6884.
34. Gjorevski N., Nelson C.M. (2009) Bidirectional extracellular matrix signaling during tissue morphogenesis. *Cytokine Growth Factor Rev.*, 20: 459-465.
35. Mori H., Gjorevski N., Inman J.L., Bissell M.J., Nelson C.M. (2009) Self-organization of engineered epithelial tubules by differential cellular motility. *Proc. Natl. Acad. Sci. USA*, 106: 14890-14895.
36. Gomez E.W., Chen Q.K., Gjorevski N., Nelson C.M. (2010) Tissue geometry patterns epithelial-mesenchymal transition via intercellular mechanotransduction. *J. Cell. Biochem.*, 110: 44-51.
37. Gjorevski N., Nelson C.M. (2010) Branch formation in organ development. *Wiley Interdiscip. Rev. Systems Biol. Med.*, 2: 734-741.
38. Raghavan S., Nelson C.M., Baranski J.D., Lim E., Chen C.S. (2010) Geometrically controlled endothelial tubulogenesis in micropatterned gels. *Tissue Eng.*, 16: 2255-2263.
39. Liu Z., Tan J.L., Cohen D.M., Yang M.T., Sniadecki N.J., Ruiz S.A., Nelson C.M., Chen C.S. (2010) Mechanical tugging forces regulate the size of cell-cell junctions. *Proc. Natl. Acad. Sci. USA*, 107: 9944-9949.
40. Gjorevski N., Nelson C.M. (2010) The mechanics of development: models and methods for tissue morphogenesis. *Birth Defects Res. C Embryo Today*, 90: 193-202.
41. Boghaert E., Nelson C.M. (2010) Tumor microenvironment and host/stroma interactions: Guidelines for physical modeling. In *Biophysical Modeling of Cancer in Silico* (ed. Cristini V.), in press.
42. Pavlovich A.L., Manivannan S., Nelson C.M. (2010) Adipose stroma induces branching morphogenesis of engineered epithelial tubules. *Tissue Eng. Part A.*, 16: 3719-3726.
43. Gjorevski N., Nelson C.M. (2010) Endogenous patterns of mechanical stress are required for branching morphogenesis. *Integr. Biol.*, 2: 424-434.

Program Director/Principal Investigator (Last, First, Middle):

44. Raghavan S., Shen C.J., Desai R.A., Sniadecki N.J., Nelson C.M., Chen C.S. (2010) Decoupling diffusional from dimensional control of signaling in 3D culture reveals a role for myosin in tubulogenesis. *J. Cell Sci.*, 123: 2877-2883.
45. Gomez E.W., Nelson C.M. (2011) Lithographically-defined two- and three-dimensional tissue microarrays. *Biological Microarrays (Methods in Molecular Biology vol. 671)*, 107-116.
46. Pavlovich A.L., Boghaert E., Nelson C.M. (2011) Mammary branch initiation and extension are inhibited by separate pathways downstream of TGFbeta in culture. *Exp. Cell Res.*, in press.
47. Manivannan S., Gleghorn J.P., Nelson C.M. (2011) Engineered tissues to quantify collective cell migration during morphogenesis. *Kidney Development: Methods and Protocols (Methods in Molecular Biology)*, in press.
48. Lee K., Gjorevski N., Boghaert E., Radisky D.C., Nelson C.M. (2011) Snail1, Snail2, and E47 promote mammary epithelial branching morphogenesis. *EMBO J.*, in press.