



Curriculum Vitae

NAME Huang, Ngan Fong	POSITION TITLE Assistant Professor of Cardiothoracic Surgery (Stanford University); and Biomedical Engineer (VA Palo Alto Health Care System)
eRA COMMONS USER NAME HUANG.NGAN	

EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	YEAR(s)	FIELD OF STUDY
MIT, Cambridge, MA	B.S. (06/2002)	1998-2002	Chemical Engineering
UC Berkeley & UCSF, Berkeley, CA	M.S. (12/2005)	2002-2005	Bioengineering
UC Berkeley & UCSF, Berkeley, CA	PhD (12/2006)	2002-2006	Bioengineering
Stanford University, Stanford, CA	Postdoctoral	2007-2010	Cardiovascular Medicine

A. Positions and Honors

Employment

- Aug 2002– Dec 2006 Doctoral candidate, University of California Berkeley & University of California San Francisco Joint Graduate Program in Bioengineering, Berkeley, CA;
Dr. Song Li, PhD (mentor, Associate Professor of Bioengineering, University of California Berkeley);
Dr. Randall Lee, MD, PhD (co-mentor, Professor of Medicine, University of California San Francisco)
- Jan 2007–June 2010 Postdoctoral Research Fellow, Stanford University, Division of Cardiovascular Medicine
Dr. John Cooke, MD, PhD (mentor, Professor of Medicine)
- July 2010–Dec 2012 Instructor, School of Medicine, Division of Cardiovascular Medicine, Stanford University
- Oct 2012- Present Biomedical Engineer and Principal Investigator, Veterans Affairs Palo Alto Health Care System, Palo Alto, CA
- May 2013- Present Assistant Professor, Department of Cardiothoracic Surgery, Stanford University, Stanford, CA

Honors

- 2002 USA Today College Academic Scholar
- 2002 Whitaker Undergraduate Research Award
- 2003-2004 Whitaker Foundation Graduate Fellowship in Biomedical Engineering
- 2004-2006 National Science Foundation Graduate Research Fellowship
- 2004 Biomedical Engineering Society (BMES) Annual Conference Graduate Student Award
- 2006 University of California Berkeley Graduate Student Teaching Award
- 2007 Vascular Biology & Medicine Training Grant Postdoctoral Fellowship, Division of Cardiovascular Medicine, Stanford University
- 2008-2009 American Heart Association Postdoctoral Research Fellowship
- 2009-2010 Ruth L. Kirschstein National Research Service Award (NRSA) Postdoctoral Fellowship

2010 Pathway to Independence (K99/R00) NIH Career Development Grant
2011 Society for Vascular Medicine Jay D. Coffman Young Investigator Award, First Place in Basic Science
2012 American Heart Association Council on Peripheral Vascular Disease, Robert W Hobson II MD Early Career Investigator Award
2014 Travel Award Winner, Arteriosclerosis Thrombosis and Vascular Biology Meeting, from the American Heart Association Council on Peripheral Vascular Disease
2014 Travel Award Winner, American Heart Association Scientific Sessions, from the Council on Arteriosclerosis Thrombosis and Vascular Biology
2014 CHEM-H (Stanford Chemistry, Engineering & Medicine for Human Health) Faculty Fellow
2015 McCormick and Gabilan Fellow, Stanford University
2016 American Heart Association Council on Peripheral Vascular Disease, Fellow of the American Heart Association (FAHA) Class of 2016
2017 Rising Star Award, Cellular and Molecular Bioengineering Annual Conference
2017 Young Innovator Award, Biomedical Engineering Society
2017 Featured as “Emerging Investigator” in *Biomaterials Science* Emerging Investigators issue
2017 Young Innovator Award, Tissue Engineering and Regenerative Medicine-Americas TERMIS-Am)
2017 American Heart Association Council on Peripheral Vascular Disease, Jay D. Coffman Young Investigator Award, 2nd Place

Professional Societies

2004-Present Biomedical Engineering Society (BMES) member
2005-Present International Society for Stem Cell Research (ISSCR) member
2007-Present Stanford University Cardiovascular Institute Member
2008-Present Society for Vascular Medicine associate member
2008-Present American Heart Association Member
2011-Present Associate Editor, *Am J Trans Res*
2012-Present Materials Research Society Member
2012-Present Stanford University Bio-X Member
2012-Present Stanford University Child Health Research Institute Member
2013-Present Stanford University Cardiovascular Institute, Steering Committee Member
2014-Present Veterans Affairs Palo Alto Health Care System, Subcommittee for Research Safety Committee Member
2016-Present American Heart Association Council on Peripheral Vascular Disease, Fellow of the American Heart Association (FAHA) Class of 2016

National Committees:

01/2014-Present American Heart Association, Council on Peripheral Vascular Disease, Early Career and Fellows in Training Committee member
10/2016-Present International Committee Member, Biomedical Engineering Society
12/2016-12/2017 Secretary, Cardiac & Vascular Regeneration and Remodeling Thematic Working Interest Group, Tissue Engineering and Regenerative Medicine-Americas (TERMIS-Am)
01/2017-Present New Organ Alliance Roadmap Committee Member—Cardiovascular
05/2017-Present Tissue Engineering Special Interest Group, Society for Biomaterials, web representative
06/2017-Present Diversity Committee, Subcommittee on Education and Community Outreach, American Heart Association, Council on Arteriosclerosis Thrombosis and Vascular Biology
12/2017-Present Vice Chair, Cardiac & Vascular Regeneration and Remodeling Thematic Working Interest Group, Tissue Engineering and Regenerative Medicine-Americas (TERMIS-Am)
05/2018-Present Chair of Membership Committee, International Society for Applied Cardiovascular Biology (ISACB)

National Service:

01/2014	Session Chair, Materials and technologies for nanoscale tissue engineering (Track 4-1) "Nanoengineering on regenerative medicine and tissue engineering;" ASME Global Congress on Nanoengineering for Medicine and Biology, San Francisco, CA
05/2015	Co-Organizer, Stanford Cardiovascular Tissue Engineering Symposium, Stanford, CA
10/2015	Biomedical Engineering Society Annual Conference, Tampa, FL, Session Chair, Cardiovascular Engineering Track, session "Imaging in Cardiovascular Systems"; and "Angiogenesis II"
10/2016	Biomedical Engineering Society Annual Conference, Minneapolis, MN, Panelist on Alternative Careers in Biomedical Engineering
12/2016	Tissue Engineering and Regenerative Medicine-Americas (TERMIS-AM) Annual Conference, Session Chair, "Potpourri"
12/2017	Tissue Engineering and Regenerative Medicine-Americas (TERMIS-AM) Annual Conference, Session Chair, "Vascular Tissue Engineering and Tissue Vascularization"
04/2018	Society for Biomaterials Annual Conference, Atlanta, GA, Session Chair, "Biomaterials for Cardiovascular Regeneration"
05/2018	Session Moderator, "Translational Science of Vascular Medicine: Cutting-Edge Technologies", Vascular Discovery: From Genes to Medicine, Scientific Sessions 2018, San Francisco, CA

Grant Reviewer and Editorial Boards

2014-2016t	Review Committee Member, American Heart Association National Innovative Research Grant (Summer)
2017-Present	Review Committee Member, NIH CVRS IRG - Myocardial Ischemia and Metabolism Study Section [MIM]
2017-Present	Austrian Science Fund FWF grant reviewer
2017-Present	Stanford Child Health Research Institute seed grant reviewer
2017-Present	Swiss National Science Foundation grant reviewer
2018-Present	Editorial Board, Communications Biology
2018-Present	Editorial Board, Frontiers in Cardiovascular Science
2018-Present	Editorial Board, Scientific Reports

Local (or Institutional) Committees and Task Forces:

10/13-Present	Stanford University Cardiovascular Institute, Steering Committee Member
01/14-08/18	Veterans Affairs Palo Alto Health Care System, Subcommittee for Research Safety Member
08/18-Present	Veterans Affairs Palo Alto Health Care System, Institutional Animal Care and Use Committee Member
08/18-Present	Departmental Representative, Women's Health & Sex Differences in Medicine (WHSDM) Center

B. Peer-Reviewed Publications (77 in total)

Original Research

1. Huang NF, Gupta M, Varghese S, Rao S, Luke S. Detection of Numerical Chromosomal Abnormalities in Epithelial Ovarian Neoplasms by Fluorescence in situ Hybridization (FISH) and a Review of Current Literature. **Appl Immunohistochem Mol Morphol** 10: 187-193, 2002
2. Thakar RG, Ho F, Huang NF, Liepmann D, Li S. Regulation of Vascular Smooth Muscle Cells by Micropatterning. **Biochem Biophys Res Com** 307:883-890, 2003
3. Levenberg S, Huang NF, Lavik E, Rogers AB, Itskovitz-Eldor J, Langer R. Differentiation of Human Embryonic Stem Cells on Three-Dimensional Polymer Scaffolds. **Proc Natl Acad Sci U S A** 100:12741-46, 2003
4. Pujar NS, Huang NF, Daniels CL, Dieter L, Gayton MG, Lee AL. Based-Catalyzed Hydrolysis of Phosphodiester Bonds in Pneumococcal Polysaccharides. **Biopolymers** 75: 71-84, 2004

5. Huang N, Thakar R, Wong M, Kim D, Lee R, Li S. Tissue Engineering of Muscle on Micropatterned Polymer Films. **Conf Proc IEEE Eng Med Biol Soc** 7:4966-9, 2004
6. Huang NF, Yu J, Sievers R, Li S, Lee RJ. Injectable Biopolymers Enhance Angiogenesis after Myocardial Infarction. **Tissue Eng** 11:1860-1866, 2005
7. Huang NF, Patel S, Thakar RG, Wu J, Hsiao BS, Chu B, Lee RJ, Li S. Skeletal Muscle Morphogenesis on Micropatterned and Nanopatterned Biopolymers. **Nano Lett** 6:537-542, 2006
8. Huang NF, Sievers RE, Park JS, Fang Q, Li S, Lee RJ. A Rodent Model of Myocardial Infarction for Testing the Efficacy of Cells and Polymers for Myocardial Reconstruction. **Nature Protoc** 1:1596-1609, 2006
9. Lee RJ, Fang Q, Davol PA, Gu Y, Sievers RE, Grabert RC, Gall JM, Tsang E, Yee MS, Fok H, Huang NF, Padbury JF, Larrick JW, Lum LG. Antibody Targeting of Stem Cells to Infarcted Myocardium. **Stem Cells** 25:712-7, 2007
10. Huang NF, Niiyama H, De A, Gambhir SS, Cooke JP. Embryonic Stem Cell-Derived Endothelial Cells for Treatment of Hindlimb Ischemia. **J Vis Exp** 23:1034, 2009. PMCID: 2781824
11. Niiyama H, Huang NF, Rollins MD, Cooke JP. Murine model of hindlimb ischemia. **J Vis Exp** 23:1035, 2009. PMCID: PMC2763292
12. Yu J, Huang NF*, Wilson KD, Velotta JB, Huang M, Li Z, Lee A, Robbins RC, Cooke JP, Wu JC. nAChRs Mediate Human Embryonic Stem Cell-Derived Endothelial Cells: Proliferation, Apoptosis, and Angiogenesis. **PLoS One**, 4:e7040, 2009 (*co-first author). PMCID: PMC 2737633
13. Huang NF, Lam A, Fang Qizhi, Sievers RE, Li S, Lee RJ. Bone Marrow-Derived Mesenchymal Stem Cells in Fibrin Augments Angiogenesis in the Chronically Infarcted Myocardium. **Regen Med** 4:527-538, 2009. PMCID: PMC 2778008
14. Huang NF, Lee RJ, Li S. Engineering of Aligned Skeletal Muscle by Micropatterning. **Am J Transl Res**, 2:43-55, 2010. PMCID: PMC 2826821
15. Huang NF, Fleissner F, Sun J, Cooke JP. Role of nitric oxide signaling in endothelial differentiation of embryonic stem cells **Stem Cells Dev** 19:1617-1625, 2010. PMCID: PMC 3121801.
16. Huang NF, Niiyama H, Peter C, De A, Natkunam Y, Fleissner F, Li Z, Rollins MD, Wu JC, Gambhir SS, Cooke JP. Embryonic Stem Cell-Derived Endothelial Cells Engraft into the Ischemic Hindlimb and Restore Perfusion. **Arterioscler Thromb Vasc Biol** 30:984-91, 2010. PMCID: PMC 2874560
17. Huang NF, Patlolla B, Abilez OA, Sharma H, Beygui RE, Zarins CK, Cooke JP. A Matrix Micropatterning Platform for Cell Localization and Stem Cell Fate Determination. **Acta Biomater**, 6: 4614-21, 2010 PMCID: PMC 2957527
18. Huang NF, Chu J, Lee RJ, Li S. Biophysical and Chemical Effects of Fibrin on Mesenchymal Stromal Gene Expression. **Acta Biomater**, 6: 3947-3956, 2010. PMCID: PMC 2930106
19. Abdul Jalil R, Huang NF*, Jame S, Lee J, Nguyen HN, Byers B, De A, Okogbaa J, Rollins MD, Reijo-Pera R, Gambhir SS, Cooke JP. Endothelial Cells Derived From Human iPSCs Increase Capillary Density and Improve Perfusion in a Mouse Model of Peripheral Arterial Disease. **Arterioscler Thromb Vasc Biol**, 31:e72-79, 2011 (*co-first author). PMCID: PMC 3210551
20. Huang NF, Kurpinski K, Fang Q, Lee RJ, Li S. Proteomic Identification of Biomarkers of Vascular Injury. **Am J Transl Res** 3:139-148, 2011. PMCID: PMC 3056560.
21. Hong G, Lee JC, Robinson JT, Raaz U, Xie L, Huang NF#, Cooke JP, Dai H. Multi-Functional In Vivo Vascular Imaging Using Near-Infrared II Fluorescence. **Nat Med**, 18:1841-6, 2012 (#co-corresponding author). PMCID: PMC 3595196
22. Lai E, Huang NF*, Cooke JP, Fuller GG. Aligned nanofibrillar collagen regulates endothelial organization and migration. **Regen Med** 7:649-61, 2012 (*co-first author). PCMID: PMC 3589994.
23. Huang NF, Lai E, Fuller GG, Ribeiro AS, Pan S, Pruitt B, Fuller GG, Cooke JP. Spatial patterning of endothelium modulates cell morphology, adhesiveness and transcriptional signature. **Biomaterials** 34: 2928-2937, 2013. PCMID: PMC 3581686.
24. Huang NF, Okogbaa JN, Lee JC, Paukshto M, Zaitseva T, Cooke JP. The Modulation of Endothelial Cell Morphology, Function, and Survival Using Anisotropic Nanofibrillar Collagen Scaffolds. **Biomaterials**, 34: 4038-4047, 2013. PMCID: PMC 3695739.

25. Li J, Huang NF*, Zou J, Laurent TJ, Lee JC, Okogbaa J, Cooke JP, Ding S. Conversion of Human Fibroblasts to Functional Endothelial Cells by Defined Factors. **Arterioscler Thromb Vasc Biol**, 33:1366-75, 2013 (*co-first author) PMID: PMC 3898631.
26. Jalil RA, Huang NF*, Kim J, Herold J, Volz KS, Park TS, Lee JC, Zambidis ET, Reijo-Pera R, Cooke, JP. Human Induced Pluripotent Stem Cell-Derived Endothelial Cells Exhibit Functional Heterogeneity **Am J Transl Res** 5:21-35, 2013 (*co-first author) PMID: PMC 3560482.
27. Huang NF, Dewi RE, Okogbaa J, Lee JC, Rufaihah AJ, Heilshorn SC, Cooke, JC. Chemotaxis of human induced pluripotent stem cell-derived endothelial cells. **Am J Transl Res** 5:510-520, 2013. PMID: PMC 3745438.
28. Bakr A, Pak O, Taye A, Hamada F, Hemeida R, Janssen W, Gierhardt M, Ghofrani HA, Seeger W, Grimminger F, Schermuly RT, Witzentrath M, Brandes RP, Huang N, Cooke JP, Weissmann N, Sommer N. Effects of dimethylarginine dimethylaminohydrolase-1 overexpression on the response of the pulmonary vasculature to hypoxia. **Am J Respir Cell Mol Biol**. 49:491-500, 2013. PMID: PMC 3824049.
29. Ghebremariam YT, Huang NF, Kambhampati S, Volz KS, Joshi GG, Anslyn EV, Cooke JP. Characterization of a Fluorescent Probe for Imaging Nitric Oxide. **J Vasc Surg**, 51:68-79, 2014. PMID: PMC 3927988.
30. Ostrowski MA, Huang NF, Walker TW, Verwijlen T, Poplawski C, Khoo AS, Cooke JP, Fuller GG, Dunn AR. Microvascular Endothelial Cells Migrate Upstream and Align Against the Shear Stress Field Created by Impinging Flow. **Biophys J** 106:366-374, 2014. PMID: PMC 3907231.
31. Hong G, Lee JC, Jha A, Diao S, Nakayama KH, Hou L, Doyle TC, Robinson JT, Antaris AL, Dai H, Cooke JP, Huang NF. Near-Infrared II Fluorescence for Imaging Hindlimb Vessel Regeneration with Dynamic Tissue Perfusion Measurement. **Circ Cardiovasc Imaging** 7:517-525, 2014. (*corresponding author) PMID: PMC 4079035.
32. Mulyasmita W, Cai L, Dewi RE, Jha A, Ullmann SD, Luong RH, Huang NF, Heilshorn SC. Avidity-controlled hydrogels for injectable co-delivery of induced pluripotent stem cell-derived endothelial cells and growth factors. **J Control Release** 191:71-81, 2014. PMID: PMC4518026
33. Burrige PW, Metzler SA, Nakayama K, Abilez OJ, Simmons CS, Bruce MA, Matsuura Y, Kim P, Wu JC, Butte M, Huang NF[#], Yang PC. Multi-cellular Interactions Sustain Long-Term Contractility of Human Pluripotent Stem Cell-Derived Cardiomyocytes. **Am J Trans Res**, 6:724-735, 2014. ([#]co-corresponding author) PMID: PMC4297340
34. Yuan K, Orcholski M, Panaroni C, Shuffle EM, Huang NF, Jiang X, Tian W, Vldar EK, Wang L, Nicolls MR, Wu J, de Jesus Perez VA. Activation of the Wnt/Planar Cell Polarity Pathway Is Required for Pericyte Recruitment during Pulmonary Angiogenesis. **Am J Pathol** 20185:69-84, 2015. PMID: PMC4278244
35. Nakayama KH, Hong G, Lee JC, Patel J, Edwards B, Zaitseva TS, Paukshto MV, Dai H, Cooke JP, Woo YJ, Huang NF. Aligned-Braided Nanofibrillar Scaffold with Endothelial Cells Enhances Arteriogenesis. **ACS Nano** 9: 6900–6908, 2015. PMID: PMC4757475.
36. Dash R, Kim PJ, Matsuura Y, Ikeno F, Metzler S, Huang NF, Lyons JK, Nguyen PK, Ge X, Wong Po Foo C, McConnell MV, Wu JC, Yeung AC, Harnish P, Yang PC. Manganese-Enhanced Magnetic Resonance Imaging Enables In Vivo Confirmation of Peri-Infarct Restoration Following Stem Cell Therapy in a Porcine Ischemia-Reperfusion Model. **J Am Heart Assoc**, 4: pii: e002044, 2015. PMID: PMC4608088.
37. Nakayama KH, Joshi PA, Lai ES, Gujar P, Joubert L-M, Chen B, Huang NF. Bi-layered vascular graft derived from human induced pluripotent stem cells with biomimetic structure and function. **Regen Med** 10:745-55, 2015. PMID: PMC4760352.
38. Nakayama KH, Surya VN, Gole M, Walker TW, Yang W, Lai ES, Ostrowski MA, Fuller GG, Dunn AR, Huang NF. Nanoscale Patterning of Extracellular Matrix Alters Endothelial Function under Shear Stress. **Nano Lett**, 16:410-9, 2016. PMID: PMC4758680.
39. Giordano S, Zhao X, Xing D, Hage F, Oparil S, Cooke JP, Lee J, Nakayama KH, Huang NF, Chen Y-F. Targeted Delivery of Human iPS-ECs Overexpressing IL-8 Receptors Inhibits Neointimal and Inflammatory Responses to Vascular Injury in the Rat. **Am J Physiol Heart Circ Physiol**. 310:H705-15, 2016. PMID: PMC4865064.

40. Hadamitzky C, Zaitseva TS, Bazalova-Carter M, Paukshto MV, Hou L, Strassberg Z, Ferguson J, Matsuura Y, Dash R, Yang PC, Kretchetov S, Vogt PM, Rockson SG, Cooke JP, Huang NF. Aligned nanofibrillar collagen scaffolds - Guiding lymphangiogenesis for treatment of acquired lymphedema. **Biomaterials** 102:259-67, 2016. PMID: PMC5157930.
41. Hou L, Collier J, Natu V, Hastie TJ, Huang NF. Combinatorial Extracellular Matrix Microenvironments Promote Survival and Phenotype of Human Induced Pluripotent Stem Cell-Derived Endothelial Cells in Hypoxia. **Acta Biomater.** 44: 199-199, 2016. PMID: PMC5045796.
42. Deveza L, Choi J, Lee J, Huang N, Cooke J, Yang F. Polymer-DNA nanoparticle-induced CXCR4 overexpression improves stem cell engraftment and tissue regeneration in a mouse hindlimb ischemia model. **Theranostics** 6:1176-1189, 2016. PMID: PMC4893644.
43. Yuan K, Orcholski ME, Huang NF, de Jesus Perez VA. In Vivo Study of Human Endothelial-Pericyte Interaction Using the Matrix Gel Plug Assay in Mouse. **J Vis Exp.** 118, 2016. doi: 10.3791/54617. PMID: in process.
44. Clayton ZE, Yuen GSC, Sadeghipour S, Hywood JD, Wong JWT, Huang NF, Ng MKC, Cooke JP, Patel S. A comparison of the pro-angiogenic potential of human induced pluripotent stem cell derived endothelial cells and induced endothelial cells in a murine model of peripheral arterial disease. **Int J Cardiol**, 234:81-89, 2017.
45. Wanjare M, Hou L, Nakayama KH, Kim JJ, Mezak NP, Abilez OJ, Tzatzalos E, Wu JC, Huang NF. Anisotropic microfibrillar scaffolds enhance the organization and function of cardiomyocytes derived from induced pluripotent stem cells. **Biomater Sci.** 5: 1567–1578, 2017. PMID: PMC5348721
46. Hou L, Kim JJ, Wanjare M, Patlolla B, Collier J, Natu V, Hastie TJ, Huang NF. Combinatorial Extracellular Matrix Microenvironments for Probing Endothelial Differentiation of Human Pluripotent Stem Cells. **Sci Rep** 7, 6551, 2017. PMID: PMC5529516
47. Kim JJ, Hou L, Yang G, Mezak NP, Wanjare M, Joubert LM, Huang NF. Microfibrillar Scaffolds Enhance Endothelial Differentiation and Organization of Induced Pluripotent Stem Cells. **Cell Mol Bioeng**, 10:417-432, 2017. PMID: PMC5602598
48. Zhong Y, Ma Z, Zhu S, Yue J, Zhang M, Antaris AL, Yuan J, Cui R, Wan H, Zhou Y, Wang W, Huang NF, Luo J, Hu Z, Dai H. Boosting the down-shifting luminescence of rare-earth nanocrystals for biological imaging beyond 1500 nm. **Nat Commun.** 8:737, 2017. doi: 10.1038/s41467-017-00917-6. PMID: PMC5622117
49. Foster AA, Dewi RE, Cai L, Hou L, Strassberg Z, Alcazar CA, Heilshorn SC, Huang NF. Protein-engineered hydrogels enhance the survival of induced pluripotent stem cell-derived endothelial cells for treatment of peripheral arterial disease. **Biomater Sci.** 6:614-622, 2018 PMID: PMC5829050.
50. Zaitseva T, Alcazar C, Zamani M, Hou L, Sawamura S, Yakubov E, Hopkins M, Woo YJ, Paukshto M, Huang NF. Aligned Nanofibrillar Scaffolds for Controlled Delivery of Modified mRNA. **Tissue Eng Part A.** 2018 May 2. doi: 10.1089/ten.TEA.2017.0494 (epub). PMID: in progress.
51. Ma Z, Zhang M, Yue J, Alcazar C, Zhong Y, Doyle TC, Dai H, Huang NF. Near-Infrared IIb Fluorescence Imaging of Vascular Regeneration with Dynamic Tissue Perfusion Measurement and High Spatial Resolution. **Adv Funct Mater** 28, 1803417, 2018. <https://doi.org/10.1002/adfm.201803417>. PMID: in progress.
52. Hou L, Yang G, Tang S, Alcazar C, Joshi P, Strassberg Z, Kim M, Kawamura M, Woo YJ, Shrager J, Ding S, Huang NF. A small molecule derived from carboxyethylpyrrole protein adducts promotes angiogenesis in a mouse model of peripheral arterial disease. **JAHA** 27:e009234, 2018. DOI: 10.1161/JAHA. PMID: in progress.
53. Nakayama KH, Alcazar C, Yang G, Quarta M, Paine P, Doan L, Davis A, Rando TA, Huang NF. Rehabilitative Exercise and Spatially Patterned Nanofibrillar Scaffolds Enhance Vascularization and Innervation Following Volumetric Muscle Loss. **npj Regen Med**, 2018. doi: 10.1038/s41536-018-0054-3. PMID: in progress.

Reviews

1. Huang NF, Zac-Varghese S, Luke S. Apoptosis in Skin Wound Healing. **Wounds** 15:182-94, 2003
2. Eisenbud D, Huang NF, Luke S, Silberklang M. Skin Substitutes and Wound Healing: Current Status and Challenges. **Wounds** 16: 2-17, 2004
3. Li S, Huang NF, Hsu S. Mechanotransduction in Endothelial Cell Migration. **J Cell Biochem** 96:1110-1126, 2005
4. Park JS, Huang NF, Kurpinski KT, Patel S, Hsu S, Li S. Mesenchymal Stem Cells: Mechanobiology and cardiovascular therapies. **Front Biosci** 12:5098-5116, 2007
5. Huang NF, Lee RJ, Li S. Chemical and Physical Regulation of Stem Cells and Progenitor Cells: Potential for Cardiovascular Tissue Engineering. **Tissue Eng** 13:1809-1823, 2007
6. Huang NF, Li S. Mesenchymal Stem Cells for Vascular Regeneration. **Regen Med** 3:877-92, 2008. PMID: PMC2596657
7. Huang NF, Li S. Regulation of the matrix microenvironment for stem cell engineering and regenerative medicine. **Annals Biomed Eng** 39:1201-1214, 2011. PMID: PMC3568678
8. Huang NF, Okogbaa J, Babakhanyan A, Cooke JP. Bioluminescence Imaging of Stem Cell Survival for Vascular Regeneration. **Theranostics** 2:346-54, 2012 PMID: PMC3326722
9. Wong WT, Huang NF, Botham CM, Sayed N, Cooke JP. Endothelial Cells Derived From Nuclear Reprogramming. **Circ Res** 2012 111:1363-75. PMID: PMC3526979
10. Nakayama K, Hou L, Huang NF. Role of Extracellular Matrix Signaling Cues in Modulating Cell Fate Commitment for Cardiovascular Tissue Engineering. **Adv Healthc Mater** 3:628-41, 2014. PMID: PMC4031033.
11. Hou L, Kim JJ, Woo YJ, Huang NF. Stem Cell-Based Therapies to Promote Angiogenesis in Ischemic Cardiovascular Disease. **Am J Physiol Heart Circ Physiol**. 310:H455-65, 2016. PMID: PMC4796616
12. Kim JJ, Hou L, Huang NF. Vascularization of three-dimensional engineered tissues for regenerative medicine applications. **Acta Biomater**. 41:17-26, 2016. PMID: PMC4969172
13. Ogle BM, Bursac N, Domian I, Huang NF, Menasché P, Murry CE, Pruitt B, Radisic M, Wu JC, Wu SM, Zhang J, Zimmermann WH, Vunjak-Novakovic G. Distilling complexity to advance cardiac tissue engineering. **Sci Transl Med**. 8: 342ps13, 2016. PMID: PMC4959426
14. Wanjare M, Huang NF. Regulation of the Microenvironment for Cardiac Tissue Engineering. **Regen Med**. 12:187-201, 2017. PMID: PMC5348721
15. Carcamo-Orive I, Huang NF, Quertermous T, Knowles JW. iPSC-derived endothelial cells in insulin resistance and metabolic syndrome. **Arterioscler Thromb Vasc Biol** 37:2038-2042, 2017. PMID: PMC5669062

Textbooks and Book Chapters

1. Levenberg S, Huang NF, Itskovitz-Eldor J, Langer R. Endothelial Cells Derived from Human Embryonic Stem Cells. In: **Human ES Cells: Basic Biology and Multilineage Differentiation**. Bios Scientific Publishers, Ltd., Oxford, UK, 2004 (ISBN# 9781859962787)
2. Huang NF, Gupta M, Luke S. Detection of Genetic Abnormalities in Ovarian Carcinoma. In: **Immunohistochemistry and in situ Hybridization of Human Carcinomas**. Vol 4, Elsevier Science Press, NY, 2006 (ISBN# 9780123339416)
3. Huang NF, Li S. Mesenchymal Stem Cells for Tissue Regeneration. In: **Stem Cell and Tissue Engineering**. World Scientific Publishing Co: NY, 2011 (ISBN# 9789814317054)
4. Huang NF. Tissue Engineering and Regenerative Medicine: Role of Extracellular Matrix Microenvironment. In: **Stem Cells and Cancer Stem Cells**. Volume 9: 313-324, Springer, NY, 2013 (ISBN# 9400756445)
5. Lee JC, Huang NF, Cooke JP. Hindlimb Ischemia. In: **Manual of Research Techniques in Cardiovascular Medicine**. Ed. Roberto Bolli. Wiley-Blackwell, NY, 2014 (ISBN# 0470672692)
6. Hou L, Huang NF. Stem Cell-Derived Endothelial Cells for Cardiovascular Regeneration. In: **Engineering Stem Cells for Tissue Regeneration**. World Scientific Publishing Co: NY, 2018
7. Guang Yang, Huang NF, Li S. Mesenchymal Stem Cells for Tissue Regeneration. In: **Engineering Stem Cells for Tissue Regeneration**. World Scientific Publishing Co: NY, 2018

8. Huang NF, Nicolas L'Heureux, Song Li (Editors). **Engineering Stem Cells for Tissue Regeneration**. World Scientific Publishing Co: NY, 2018 (ISBN: 978-981-3147-74-4)
9. Wanjare M, Huang NF. Stem Cells: Efficacy In Peripheral Vascular Diseases. In: **The Encyclopedia of Tissue Engineering and Regenerative Medicine** (Ed: David Warburton). Elsevier Inc, Waltham, MA, 2018 (in press).

Patents

1. Su J, Huang NF. Carbon Nanotube Reinforced Porous Carbon Having Three-Dimensionally Ordered Porosity and Method of Fabricating Same. This patent describes the invention of a porous carbon device which can be useful for electrochemical energy storage devices, thermal dispersion devices, and electric charge dispersion devices. United States of America as represented by the Administrator of the National Aeronautics and Space Administration (US Patent#7252884, filed 2001, issued 2007)
2. Li S, Patel S, Hashi C, Huang NF, Kurpinski K. Fabrication of aligned nanofiber scaffolds for vascular and muscular tissue engineering. The Regents of The University of California (US Patent Application # US20070269481, filed 2007). This patent application describes the development of vascular and muscular grafts with aligned cellular and matrix structure. Licensee: NanoVasc and NanoNerve.
3. Levenberg S, Huang NF, Lavik EB, Itskovitz-Eldor J, Langer R. Engineering Three-Dimensional Tissue Structures Using Differentiating Embryonic Stem Cells. Massachusetts Inst Technology and Technion Res & Dev Foundation (US Patent Application # 20050031598, filed 2005). This invention describes the development of three-dimensional tissue structures using human embryonic stem cells and porous scaffolds.
4. Huang NF, Zaitseva T, Paukshto M, Fuller GG, Cooke JP, Martin GR. A Graft For Directed Vascular And Lymphatic Regeneration And Methods To Guide Endothelial Cell Assembly. Fibralign Corporation and The Board of Trustees of Leland Stanford Junior University. (US Patent Application # US 20140242347; serial # 14/351,128)
5. Hong G, Lee J, Huang NF, Cooke JP, Dai H. Vascular imaging using near infrared fluorescence. The Board of Trustees of Leland Stanford Junior University. (US Patent Application # 2012066157; serial # 14/443,899)

Abstracts

1. Luke S, Huang NF, Goyal N, Varkey JA, Alsay-Oculam AA, Gupta M, Ladoulis CT. Optimization of Fluorescence in situ Hybridization (FISH) in Cytological Specimens, The 5th International Conference and Workshops of Molecular Morphology, Jacksonville, Florida, 1997
2. Su J, Siochi EJ, Huang N. Carbon Nanotube Reinforced Three Dimensionally Ordered Porous Carbon, MRS Spring Meeting, San Francisco, CA, April 1-5, 2002
3. Levenberg S, Huang NF, Lavik E, Rogers AB, Itskovitz-Eldor J, Langer R. Differentiation of Human Embryonic Stem Cells on three Dimensional Polymer Scaffolds, Tissue Engineering Society International Annual Meeting, Orlando, FL, Dec 10-13, 2003
4. Huang NF, Hsu S, Fang Q, Lee RJ, Li S. Cell-Cell Interaction Prolongs Cardiomyocyte Phenotype and Promotes CD34+ Cell Differentiation, BMES Conference, Nashville, TE, Oct 1-4, 2003
5. Thakar RG, Ho F, Huang NF, Li S. Regulation of Vascular Smooth Muscle Cells by Micropatterning, BMES Conference, Nashville, TE, Oct 1-4, 2003
6. Levenberg S, Huang NF, Lavik E, Rogers AB, Itskovitz-Eldor J, Langer R. Physical Cues for Forming Three-Dimensional Tissue Structures Using Differentiating Human Embryonic Stem Cells, Keystone Symposia, From Stem Cells to Therapy, Steamboat Springs, CO, Mar 2003
7. Huang NF, Yu J, Sievers R, Li S, Lee RJ. Injectable Biopolymers for Therapeutic Remodeling of the Myocardium, BMES Conference, Philadelphia, PA, Oct 13-16, 2004
8. Huang NF, Thakar RG, Lee RJ, Li S. Engineered Skeletal Muscle on Micropatterned Biopolymer, BMES Conference, Philadelphia, PA, Oct 13-16, 2004
9. Huang N, Thakar R, Wong M, Kim D, Lee R, Li S. Tissue Engineering of Muscle on Micropatterned Polymer Films, International Conference of the IEEE Engineering in Medicine and Biology Society, September 1-4, San Francisco, California, 2004

10. Huang NF, Fang Qizhi, Sievers RE, Li S, Lee RJ. Therapeutic Delivery of Mesenchymal Stem Cells in Fibrin for Repair of Myocardial Infarction, BMES Conference, Baltimore, MD, Sept 28- Oct 1, 2005
11. Huang NF, Fang Qizhi, Sievers RE, Li S, Lee RJ. Mesenchymal Stem Cells in Fibrin Biopolymer for Therapeutic Repair of Myocardial Infarction, 3rd Annual Conference of the International Society for Stem Cell Research, San Francisco, CA June 23-25, 2005
12. Huang NF, Lam A, Fang Qizhi, Sievers RE, Li S, Lee RJ. Injectable Delivery of Mesenchymal Stem Cells in Fibrin for Therapeutic Repair of Chronic Myocardial Infarction. American Heart Association Scientific Sessions, Chicago, IL, Nov 12-15, 2006
13. Huang NF, Niiyama H, Fleissner F, Li Z, Rollins MD, Wu JC, Cooke JP. Non-invasive tracking of embryonic stem cell-derived endothelial cells for vascular repair. Biomedical Engineering Society Conference, Los Angeles, CA, Sept 27-30, 2007
14. Wu JC, Huang NF, Cooke JP. ADMA: An Endogenous Mediator of ESC Differentiation and EC Regeneration, International Society for Stem Cell Research, Cairns, Australia, Jun 17-20, 2007.
15. Huang NF, Niiyama H, Fleissner F, Li Z, Rollins MD, Wu JC, Cooke JP.
16. A Comparison of Embryonic Stem Cell Delivery Modalities for Treatment of Critical Limb Ischemia, Society for Vascular Medicine and Biology, Minneapolis, MN, May 28- Jun 1, 2008
17. Huang NF, Niiyama H, Peter C, De A, Natkunam Y, Fleissner F, Li Z, Rollins MD, Wu JC, Gambhir SS, Cooke JP. Restoration of Hindlimb Perfusion by Embryonic Stem Cell-Derived Endothelial Cells, AHA Scientific Sessions, Orlando, FL, Nov 14-18, 2009
18. Gaber A, Sommer N, Huang N, Ghofrani HA, Schermuly RT, Seeger W, Grimminger F, Cooke JP, Weissmann N. Hypoxia induced pulmonary hypertension—The role of dimethylarginine dimethylaminohydrolase 1 (DDAH-1) in acute and sustained hypoxic vasoconstriction, European Respiratory Society Annual Congress, Vienna, Sept 12-15, 2009
19. Huang NF, Niiyama H, Peter C, De A, Natkunam Y, Fleissner F, Li Z, Rollins MD, Wu JC, Cooke JP. Restoration of Hindlimb Perfusion by Embryonic Stem Cell-Derived Endothelial Cells, NHLBI Symposium on Cardiovascular Regenerative Medicine, Bethesda, MD, Oct 14-15, 2009
20. Huang NF, Jalil RA, Jame S, Nguyen HN, De A, Gambir S, Reijo-Pera R, Cooke JP. Human Induced Pluripotent Stem Cell-Derived Endothelial Cells For Treatment of Murine Hindlimb Ischemia. Conference of the International Society for Stem Cell Research, San Francisco, CA June 16-19, 2010
21. Jalil RA, Huang NF, Nguyen HN, Hunter AL, Reijo-Pera R, Cooke, JP. Directed differentiation of human induced pluripotent stem cells into arterial, venous and lymphatic endothelial lineages. Conference of the International Society for Stem Cell Research, San Francisco, CA June 16-19, 2010
22. Huang NF, Zaitseva T, Paukshto M, Sun J, Fuller G, Cooke JP. Vascular Cellular Morphology on Aligned Collagen Matrices. Biomedical Engineering Society Annual Conference, Austin, TX, Oct 6-9, 2010
23. Lai ES, Huang NF, Anderson CM, Fuller G. Matrix-induced alignment and shear flow: effects on endothelial cells. The Society of Rheology, Cleveland, OH, October 9-13, 2011
24. Lai ES, Huang NF, Anderson CM, Fuller G. Matrix-induced alignment and shear flow: effects on endothelial cells. American Institute of Chemical Engineers at Minneapolis, MN, Oct. 16-21, 2011
25. Huang NF, Ivey K, Corbel S. Extracellular Matrix Microenvironment for Endothelial Cell and Cardiomyocyte Differentiation of hiPSCs. Progenitor Cell Biology Consortium Annual Investigator's Meeting. October 13-16, 2011, Boston, MA
26. Huang NF, Lai ES, Anderson CM, Fuller G, Cooke JP. Role of Nanofibrous Collagen Scaffolds and Flow On Endothelial Cell Morphology and Function. Progenitor Cell Biology Consortium Annual Investigator's Meeting. October 13-16, 2011, Boston, MA
27. Huang NF, Ribeiro A, Lai E, Fuller GG, Pruitt B, Cooke JP. Collagen Topographical Patterning Modulates Endothelial Cell Morphology, Gene Expression, And Function. Arteriosclerosis Thrombosis and Vascular Biology Meeting 2012 Scientific Sessions, Chicago, IL, April 18-20, 2012. (*winner of Robert W Hobson II Early Career Investigator Award)
28. Ostrowski MA, Huang NF, Walker T, Khoo S, Devicha M, Poplawski C, Cooke JP, Fuller GG, Dunn AR. Endothelial Cell Response to Complex Flow Profiles. American Society for Cell Biology, San Francisco, December 15-19, 2012
29. Dash R, Kim PJ, Matsuura Y, Ge X, Ikeno F, Lyons JK, Huang NF, Metzler S, Nguyen P, Heidary S, Parent M, Yamamoto T, Cooke J, Ruiz-Lozano P, Robbins RC, Wu JC, McConnell MV, Yeung A, Harnish P, Yang

- PC. Manganese-Enhanced cardiac MRI (MEMRI) tracks long-term in vivo survival and restorative benefit of transplanted human Amnion-Derived Mesenchymal Stem Cells (hAMSC) after porcine ischemia-reperfusion injury. 16th Annual SCMR Scientific Sessions, February 1-4, 2013, San Francisco, CA
30. Dash R, Kim PJ, Matsuura Y, Ge X, Ikeno F, Lyons JK, Huang NF, Metzler S, Nguyen P, Heidary S, Parent M, Yamamoto T, Cooke J, Ruiz-Lozano P, Robbins RC, Wu JC, McConnell MV, Yeung A, Harnish P, Yang PC. Sustained Restoration of LV Function in a Porcine Ischemia-Reperfusion Injury Model Using Human Placental Mesenchymal Stem Cells and Manganese-Enhanced MRI. American College of Cardiology, March 9-11, 2013, San Francisco, CA
 31. Huang NF, Lai E Ribeiro A, Fuller GG, Pruitt B, Cooke JP. Collagen Topographical Patterning Modulates Endothelial Cell Morphology, Gene Expression, And Function. Materials Research Society Spring Conference, April 1-5, 2013, San Francisco, CA
 32. Ostrowski M, Huang EY, Huang NF, Walker TW, Cooke JP, Dun AR, Fuller GG. Upstream migration of endothelial cells in response to impinging fluid flows. Society of Rheology, Quebec, Canada, October 13-17, 2013
 33. Huang NF, Okogbaa J, Jha A, Zaitseva T, Paukshto MV, Cooke JP. Anisotropic Nanofibrillar Collagen Modulates Endothelial Cell Morphology, Function, and Survival. ASME Global Congress on Nanoengineering for Medicine and Biology. February 2-5, 2014, San Francisco, CA
 34. Hadamitzky C, Zaitseva T, Bazalova M, Ferguson J, Rockson SG, Cooke JP, Huang NF, Paukshto MV. Lymphedema Induction and Treatment in Yucatan Minipigs. 3rd International Symposium on Lymphedema Surgical Treatment. March 5, 2014, Barcelona, Spain
 35. Hou L, Huang NF. Extracellular Matrix-Mediated Differentiation of Human Induced Pluripotent Stem Cells. Experimental Biology, San Diego, CA, April 26-30, 2014
 36. Nakayama K, Rando TA, Huang NF. Engineering Vascularized Skeletal Muscle with Physiologically-Relevant Cellular Organization. 3rd Annual Symposium on Regenerative Rehabilitation. April 10-11, 2014 San Francisco, CA
 37. Hou L, Huang NF. Extracellular matrix enhances generation of human induced pluripotent stem cell-derived endothelial cells for rehabilitative tissue engineering. 3rd Annual Symposium on Regenerative Rehabilitation. April 10-11, 2014 San Francisco, CA
 38. Huang NF*, Okogbaa J, Jha A, Lee JC, Zaitseva T, Paukshto MV. Nanopatterned Collagen Scaffolds Promote Blood Perfusion in the Ischemic Limb. Arteriosclerosis Thrombosis and Vascular Biology Meeting 2014 Scientific Sessions, May 1-3, 2014, Toronto, Canada. (*winner of Peripheral Vascular Disease Travel Award)
 39. Huang NF, Lai E, Zaitseva TS, Paukshto MV, Cooke JP. Collagen Nanopatterning Modulates Endothelial Cell Atheroprotective Function, Survival, and Angiogenesis. Basic Cardiovascular Sciences Scientific Sessions, July 14-17, 2014, Las Vegas, NV.
 40. Huang NF*, Nakayama KH, Hong G, Patel J, Edwards B, Zaitseva TS, Paukshto MV, Dai H, Cooke JP, Woo YJ. Nanopatterned Extracellular Matrices Promote Endothelial Sprouting and Arteriogenesis in a Murine Model of Peripheral Arterial Disease. AHA Scientific Sessions, Nov 16-19, 2014, Chicago, IL. (*Council on Arteriosclerosis, Thrombosis, and Vascular Biology (ATVB) Travel Award Winner)
 41. Nakayama K*, Burrige PW, Metzler SA, Abilez OJ, Simmons CS, Bruce MA, Matsuura Y, Kim P, Wu JC, Butte M, Huang NF, Yang PC. Three-Dimensional Tri-culture Model Promotes Enhanced Mechanical Forces and Sustained Long-Term Contractility of Human Pluripotent Stem Cell-Derived Cardiomyocytes. AHA Scientific Sessions, Nov 16-19, 2014, Chicago, IL. (*Travel Award Winner)
 42. Hou L, Collier J, Natu V, Huang NF. Combinatorial Extracellular Matrix Microarrays for Probing Endothelial Differentiation of Human Induced Pluripotent Stem Cells. Arteriosclerosis Thrombosis and Vascular Biology; and Peripheral Vascular Disease Annual Meeting 2015 Scientific Sessions, May 7-9, 2015, San Francisco, CA
 43. Nakayama KH, Narayanan V, Lai ES, Ostrowski M, Fuller GG, Dunn AR, Huang NF. Nanoscale Extracellular Matrix Alters Endothelial Function Under Disturbed Flow. Arteriosclerosis Thrombosis and Vascular Biology; and Peripheral Vascular Disease Annual Meeting 2015 Scientific Sessions, May 7-9, 2015, San Francisco, CA
 44. Hou L, Collier J, Natu V, Huang NF. Combinatorial Extracellular Matrix Microarrays for Probing Endothelial Differentiation of Human Induced Pluripotent Stem Cells. NIH/NHLBI K-to-R01 Meeting, July 28-29, 2015,

Bethesda, MD

45. Nakayama K, Quarta M, Garcia V, Rando TA, Huang NF. Engineering Vascularized Skeletal Muscle with Physiologically-Relevant Cellular Organization. Fourth Annual Symposium on Regenerative Rehabilitation. September 24-26, 2015 Rochester, MN.
46. Nakayama KH, Narayanan V, Gole M, Walker T, Yang W, Lai ES, Ostrowski M, Fuller GG, Dunn AR, Huang NF. Nanoscale Extracellular Matrix Alters Endothelial Function Under Disturbed Flow. Biomedical Engineering Society Annual Conference. October 7-10, 2015, Tampa, FL.
47. Kim JJ, Mezak N, Huang NF. Controllable Nanotopographical Cues from Electrospun PCL/PEO Polymer Blends Facilitate Endothelial Cell Sub-type Differentiation of Human Pluripotent Stem Cells. Biomedical Engineering Society Annual Conference. October 7-10, 2015, Tampa, FL.
48. Nakayama KH, Hong G, Lee JC, Patel J, Edwards B, Zaitseva TS, Paukshto MV, Dai H, Cooke JP, Woo YJ, Huang NF. Stem Cell-Based Anisotropic Scaffolds Promote Arteriogenesis. Biomedical Engineering Society Annual Conference. October 7-10, 2015, Tampa, FL.
49. Cai L, Dewi R, Strassberg Z, Hou L, Foster A, Heilshorn SC, Huang NF. Protein-Engineered Hydrogels for Improved Efficacy of Stem Cell-Based Injection Therapy in a Murine Model of Peripheral Arterial Disease. American Heart Association Scientific Sessions, Nov 7-11, 2015, Orlando, FL.
50. Hou L, Kim JJ, Collier J, Natu V, Huang NF. Role of Combinatorial Extracellular Matrix Proteins in Modulating Endothelial Differentiation of Human Induced Pluripotent Stem Cells. Basic Cardiovascular Science Scientific Sessions, July 18-21, 2016, Phoenix, AZ.
51. Wanjare M, Kim JJ, Huang NF. Engineered Anisotropic Substrates Promote the Function of Cocultured Cardiomyocytes Derived from Human Pluripotent Stem Cells. Basic Cardiovascular Science Scientific Sessions, July 18-21, 2016, Phoenix, AZ.
52. Nakayama K, Quarta M, Garcia V, Strassberg Z, Abilez O, Rando TA, Huang NF. Engineering Pre-Vascularized Skeletal Muscle with Physiologically-Relevant Cellular Organization for Treatment of Volumetric Muscle Loss. Biomedical Engineering Society Annual Conference. October 5-8, 2016, Minneapolis, MN.
53. Huang NF, Hou L, Strassberg Z, Hopkins M, Zaitseva T, Yakubov E, Pauksto M. Aligned Nanofibrillar Scaffolds for Controlled Delivery of Modified mRNA. Biomedical Engineering Society Annual Conference. October 5-8, 2016, Minneapolis, MN.
54. Nakayama K, Quarta M, Garcia V, Strassberg Z, Abilez O, Rando TA, Huang NF. Engineering Pre-Vascularized Skeletal Muscle with Physiologically-Relevant Cellular Organization for Treatment of Volumetric Muscle Loss. 2016 Regenerative Rehabilitation Symposium, October 14-16, 2016, Atlanta, GA
55. Huang NF, Cai L, Dewi R, Strassberg Z, Foster A, Hou L, Heilshorn SC. Co-Injection of Induced Pluripotent Stem Cell-Derived Endothelial Cells With Shear Thinning Hydrogel Enhances Survival and Angiogenesis In A Murine Model of Peripheral Arterial Disease. American Heart Association Scientific Sessions, Nov 12-16, 2016, New Orleans, LA.
56. Nakayama K*, Quarta M, Garcia V, Strassberg Z, Abilez O, Rando TA, Huang NF. Engineering Pre-Vascularized Skeletal Muscle with Physiologically-Relevant Cellular Organization for Treatment of Volumetric Muscle Loss. TERMIS-America, Dec 12-16, 2016, San Diego, CA (*Young investigator award winner).
57. Kim JJ, Hou L, Mezak NP, Wanjare M, Huang NF. Three-Dimensional Microfibrous Scaffolds Promote Endothelial Differentiation of Human Pluripotent Stem Cells. TERMIS-America, Dec 12-16, 2016, San Diego, CA
58. Huang NF, Nakayama K, Quarta M, Garcia V, Strassberg Z, Akimenko I, Abilez O, Rando TA. Engineering Pre-Vascularized Skeletal Muscle with Physiologically-Relevant Cellular Organization for Treatment of Volumetric Muscle Loss. Cell & Molecular Bioengineering –BMES, Jan 4-7, 2017, Big Island, Hawaii (*Rising Star Awardee for Huang NF)
59. Huang NF, Nakayama K, Quarta M, Garcia V, Strassberg Z, Akimenko I, Abilez O, Rando TA. Engineering Pre-Vascularized Skeletal Muscle with Physiologically-Relevant Cellular Organization for Treatment of Volumetric Muscle Loss. Society for Biomaterials, April 5-8, 2017, Minneapolis, MN
60. Hou L, Kim JJ, Wanjare M, Collier J, Natu V, Hastie TJ, Huang NF. High-Throughput Extracellular Matrix Microenvironments for Probing Endothelial Differentiation of Human Pluripotent Stem Cells. Experimental Biology, April 22-26, Chicago, IL

61. Huang NF, Hou L, Alcazar C, Strassberg Z, Hopkins M, Yakubov E, Paukshto M, Zaitseva T. Delivery of Hepatocyte Growth Factor mRNA from Nanofibrillar Scaffolds for Treatment of Peripheral Arterial Disease. Arteriosclerosis Thrombosis and Vascular Biology Meeting 2017 Scientific Sessions, May 4-6, 2017, Minneapolis, MN
62. Hou L, Kim JJ, Wanjare M, Collier J, Natu V, Hastie TJ, Huang NF. High-Throughput Extracellular Matrix Microenvironments for Probing Endothelial Differentiation of Human Pluripotent Stem Cells. International Society for Stem Cell Research, June 14-17, 2017, Boston, MA
63. Kim JJ, Hou L, Mezak NP, Wanjare M, Joubert LM, Huang NF*. Microfibrous Scaffolds Enhance Endothelial Differentiation and Organization of Induced Pluripotent Stem Cells. Biomedical Engineering Society Annual Conference, October 11-14, 2017, Phoenix, AZ (*Young Innovator Awardee for Huang NF)
64. Wanjare M, Hou L, Nakayama K, Kim J, Mezak N, Abilez O, Tzatzalos E, Wu J, Huang NF. Role of Microfiber Anisotropy and Intercellular Interaction with Endothelial Cells on the Pluripotent Stem Cell-Derived Cardiomyocytes. Biomedical Engineering Society Annual Conference, October 11-14, 2017, Phoenix, AZ
65. Hou L, Kim JJ, Wanjare M, Collier J, Natu V, Hastie TJ, Huang NF. Combinatorial Extracellular Matrix Microenvironments Induce Endothelial Differentiation of Human Pluripotent Stem Cells. North American Vascular Biology Organization, October 15-19, 2017, Monterey, CA
66. Huang NF,* Hou L, Tang S, Alcazar C, Strassberg Z, Joshi P, Kawamura M, Woo YJ, Ding S. A small molecule derived from carboxyethylpyrrole protein adducts promotes angiogenesis in a mouse model of peripheral arterial disease. American Heart Association Annual Scientific Sessions, November 10-15, Anaheim, CA (*Jay D. Coffman Young Investigator Award 2nd Place winner)
67. Yang G, Wanjare M, Nakayama K, Huang NF. Role of nanofibrillar scaffolds on endothelial function and survival. TERMIS-America Annual conference, Dec 2-6, 2017, Charlotte, NC
68. Nakayama KH, Kawamura M, Wang H, Woo YJ, Huang NF. Spatially Patterned Atheroprotective Vascular Grafts for Enhanced Patency. Society for Biomaterials, April 11-14, 2018, Atlanta, GA
69. Nakayama HK, Quarta M, Paine P, Alcazar C, Garvia V, Abilez O, Calvo NS, Simmons CS, Rando TA, Huang NF. Therapeutic Potential of Bioengineered Skeletal Muscle with Spatially Patterned Structure and Endothelial Support. Society for Biomaterials, April 11-14, 2018, Atlanta, GA
70. Huang NF. Regulation of Endothelial Function and Fate by the Extracellular Matrix (invited talk). Society for Biomaterials, April 11-14, 2018, Atlanta, GA
71. Zamani M, Alcazar CA, Hou L, Zaitseva L, Yakubov E, Paukshto M, Huang NF. Aligned Nanofibrillar Scaffolds for Controlled Delivery of Modified mRNA. Society for Biomaterials, April 11-14, 2018, Atlanta, GA
72. Yang G, Wanjare M, Nakayama KH, Zaitseva T, Paukshto MV, Huang NF. Biophysical properties of nanofibrillar scaffolds modulate endothelial cell survival in the ischemic hindlimb. Arteriosclerosis Thrombosis and Vascular Biology Meeting 2018 Scientific Sessions, May 10-12, 2018, San Francisco, CA
73. Huang NF, Wanjare M, Alcazar CA, Kawamura M, Eskandari A, Woo YJ. Spatially Patterned Scaffolds Modulate the Function of Pluripotent Stem Cell-Derived Cardiomyocytes *In Vitro* and *In Vivo*. International Society for Stem Cell Research, June 20-23, 2018, Melbourne, Australia
74. Huang NF, Foster A, Dewi R, Alcazar CA, Cai L, Hou L, Heilshorn SC. Mechanically Tunable Hydrogels Promote the Survival of Induced Pluripotent Stem Cell-Derived Endothelial Cells in Tissue Ischemia. International Society for Stem Cell Research, June 20-23, 2018, Melbourne, Australia

C. Current Research Support

ACTIVE

Ongoing Research

Research Enhancement Award Program

(Rando)

1/1/14 – 12/31/18

Department of Veterans Affairs

Innovative Rehabilitative Strategies for Muscle Dysfunction

The goals of this REAP are to develop innovative therapeutic approaches for patients with muscle dysfunction, with the particular emphasis of rehabilitative strategies integrated with regenerative and restorative treatments.

Role: Key Investigator

Merit Review Award

(Huang)

10/1/14-9/30/18

Department of Veterans Affairs

Vascularized Cardiac Patch with Physiological Orientation for Myocardial Repair

The aims are to engineer a vascularized aligned iPSC-derived CM patch and elucidating the molecular mechanisms of ECM-mediated nitric oxide signaling in enhancing iPSC-CM survival and phenotype; and to determine the therapeutic effect of a vascularized aligned iPSC-derived CM patch for treatment of myocardial infarction.

R01 HL127113-01A1

(Huang)

2/1/16-1/31/21

NIH / NHLBI

Aligned Nanofibrillar Scaffolds Enhance Angiogenesis and Viability in Ischemia

The goals are to test the hypothesis that parallel-aligned pattern of nanofibrillar scaffolds enhance iPSC-EC survival and angiogenesis under ischemic conditions in vitro. We will then assess the temporal kinetics of arteriogenesis, blood perfusion recovery, and cell survival upon implantation of the iPSC-EC seeded scaffold in animal models of PAD.

P2CHD086843 Pilot Grant, Subaward of Univ. of Pittsburgh (Huang)

7/1/16 – 6/30/19 NCE

Alliance for Regenerative Rehabilitation & Research Training

Nano-aligned Scaffold Conjugated with Insulin-Like Growth Factor-1 mRNA for Treatment of Volumetric Muscle Loss

The goal is to assess the regenerative capacity of a nanofibrillar collagen scaffold that delivers insulin-like growth factor-1 mRNA for treatment of volumetric muscle loss in a murine animal model.

DISC1 Research Grant #10603 (Huang)

4/1/2018-3/31/2019

1.2 calendar

California Institute for Regenerative Medicine

\$150,000

iPSC-Derived Smooth Muscle Progenitors for Treatment of Abdominal Aortic Aneurysm

We propose to deliver human induced pluripotent stem cell-derived smooth muscle progenitors to the site of abdominal aortic aneurysm will replenish smooth muscle cells, enhance elastin production, and abrogate wall dilatation in a murine model.

Completed Research

Postdoctoral Research Fellowship

(Huang)

7/1/08-6/31/09

American Heart Association

High Throughput Screening of Embryonic Stem Cell Differentiation into Endothelial Cells for Repair of Hindlimb Ischemia

The aims include characterization the differentiation of ESC-derived ECs in vitro using high throughput extracellular matrix (ECM) microarray approach, and assessment of incorporation and functional effects of ESC-derived ECs

F32 HL095355

(Huang)

7/1/09-6/30/10

NIH NRSA Postdoctoral Fellowship

High Throughput Screening of Embryonic Stem Cell Differentiation

The aims include characterization the differentiation of ESC-derived ECs in vitro using high throughput extracellular matrix (ECM) microarray approach, and assessment of incorporation and functional effects of ESC-derived ECs

American Heart Association

(Huang)

7/1/10-8/31/10

National Scientist Development Grant

Matrix-Mediated Endothelial Differentiation of Induced Pluripotent Stem Cells

The aims are to develop a high-throughput ECM microarray to optimize the efficiency of human iPSC differentiation into ECs, and determine the role of ECM-integrin interactions in the differentiation process; to identify ECMs that best promote survival and phenotype of iPSC-derived ECs in hypoxia, and define signaling pathways that modulate the process; and to determine the therapeutic potential of iPSC-derived ECs in ECM for treatment of PAD.

*This grant was relinquished because of scientific overlap with K99 grant

U01 HL099997

(Corbel)

4/1/11-3/31/13

NIH NHLBI Progenitor Cell Biology Consortium Pilot Study

Extracellular Matrix Microenvironment (ECM) for Endothelial and Cardiomyocyte Differentiation

The aims are to enhance the efficiency of human iPSC differentiation into endothelial cell and cardiomyocytes by modulating the ECM chemical composition as well as substrate rigidity. ECM arrays printed on hydrogels of controllable stiffness will enable high throughput assessment of matrix conditions that favor cardiovascular differentiation.

Role: Other Significant Contributor

1249008

(Huang)

1/1/13-12/31/13

National Science Foundation SBIR Phase I, Subcontract from Fibralign

Nanofibrillar Scaffolds for Tissue Engineering

The aims are to fabricate parallel-oriented porous nanofibrillar collagen scaffolds that support the viability and functional capacity of endothelial cells to promote vascular regeneration.

Research Grant

(Huang)

1/1/13 – 12/31/14

Cardiovascular Institute, Stanford University

Induced Pluripotent Stem Cell-Derived Aligned Vascular Graft with Improved Patency

We hypothesize that an iPSC-EC-seeded aligned vascular graft will inhibit monocyte adhesion, while promoting graft patency. The aims of this project are to: evaluate the role of oriented vascular grafts *in vitro* to direct iPSC-EC alignment and anti-inflammatory properties; and implant the grafts as interpositional grafts in a rat carotid artery model to examine short and long term patency.

S-13-57C

(Castillo)

1/1/13 – 12/31/14

AO Foundation

Mechanical Stimulation in Skeletal Healing

The overall goal of this work is to investigate relationships between key mechanical stimuli and healing of cortical bone defects, with a specific focus on the role of SDF-1 signaling in mechanically-modulated bone healing. The aims are to determine effects of magnitude and time of application on bone healing; and to characterize effects of SDF-1 treatment in mechanically modulated bone healing.

Role: Co-Investigator

SR00002754, Subcontract from University of Maryland (Pera)

5/1/13- 4/30/14

National Institutes of Health

NHLBI Progenitor Cell Biology Consortium Administrative Coordinating Center

This laboratory course gives trainees hands-on experience in the differentiation of pluripotent stem cells into cardiac and vascular lineages. Dr. Huang was the course instructor.

Role: Co-Investigator (Course Instructor)

W81XWH-12-C-0111, Subcontract from Fibralign (Huang)

7/1/13-1/31/14

Department of Defense, SBIR Phase I Option

Cellularized collagen implants for lymphatic regeneration

The aim is to optimize the fabrication of nanofibrillar collagen scaffolds, and to test the ability of the scaffolds to induce lymphatic regeneration in a subcutaneous mouse model.

W81XWH-12-C-0111, Subcontract from Fibralign (Huang) 4/15/13 – 4/14/15
Department of Defense, SBIR Phase II
Cell-Seeded Implant for Guided Lymphatic Regeneration
Based on encouraging Phase I results, the aim of Phase II is to demonstrate, optimize and validate the therapeutic strategy of nanofibrillar scaffolds for lymphatic regeneration in a porcine model of secondary lymphedema.

R21 AG044814 (Blau) 6/1/13 – 5/31/15
NIH / NIA
Telomere Extension Using Nucleoside-Modified mRNA and Exosomes as a Novel Therapeutic Approach
The aims are to optimize intravenous delivery of our telomere-extending mRNA-based drug to vascular endothelial and other cells; and to test the safety and efficacy of telomere extension using mRNA-based drug in the hypertensive short telomere mTERC-null mouse model.
Role: Key Investigator

SR00002754, Subcontract from University of Maryland (Sebastiano) 3/1/14- 3/31/14
National Institutes of Health
NHLBI Progenitor Cell Biology Consortium Administrative Coordinating Center
This laboratory course gives trainees hands-on experience in the differentiation of pluripotent stem cells into cardiac and vascular lineages. Dr. Huang is the instructor for this course.
Role: Co-Investigator (Course Instructor)

Seed Grant (Huang) 8/1/14-7/31/15
Stanford Chemistry, Engineering & Medicine for Human Health
Protein-engineered hydrogels for improved efficacy of stem cell-based injection therapy in a murine model for peripheral arterial disease
Using systemically delivered biocompatible SWNTs as intrinsically fluorescent imaging agents in the NIR-II region, we propose to label iPSC-ECs with SWNT fluorophores, and use NIR-II imaging to non-invasively track the homing of these cells to the ischemic limb in real time with microns spatial resolution at the single-cell level.

Phase I SBIR, Subcontract from Fibralign (Huang) 3/1/15 – 8/31/15
Department of Defense
The Plasmid-Seeded Aligned Nanofibrillar Scaffold to Promote Angiogenesis
The aim is to engineer an aligned nanofibrillar collagen scaffold that delivers hepatic growth factor plasmid and examine the ability of the scaffold to induce angiogenesis at the site of ischemic limb muscle.

SR00002754, Subcontract from University of Maryland (Sebastiano) 3/1/15- 4/30/15
National Institutes of Health
NHLBI Progenitor Cell Biology Consortium Administrative Coordinating Center
This laboratory course gives trainees hands-on experience in the differentiation of pluripotent stem cells into cardiac and vascular lineages. Dr. Huang was the course instructor.
Role: Co-Investigator (Course Instructor)

Postdoctoral Fellowship 15POST2556004 (Nakayama) 7/1/15-8/31/16
AHA Western States Affiliate
Nanoscale Extracellular Matrix Alters Endothelial Function Under Disturbed Flow
The aim is to evaluate the effect of disturbed flow on matrix-aligned endothelial cell morphology, atheroprotective function, and identification of the signaling pathways that mediate flow-induced atheroprotective properties in matrix-aligned endothelial cells. These findings are applied to evaluate the role of matrix-aligned endothelial cells in resisting atherosclerotic lesion formation *in vivo*.
Role: Mentor

No Grant #	(Huang)	9/1/15-8/31/16
McCormick Gabilan Fellowship		
Three-Dimensional Multicellular Platform for Sustained Survival and Contractility of Human Induced Pluripotent Stem Cell-Derived Cardiomyocytes		
The goal is to engineer a three-dimensional scaffold consisting of iPSC-derived cardiomyocytes, iPSC-derived endothelial cells, and placental stromal cells for enhancing myocardial function after myocardial infarction.		
SR00002754, Subcontract from University of Maryland (Sebastiano)		3/1/17- 4/30/17
National Institutes of Health		
<i>NHLBI Progenitor Cell Biology Consortium Administrative Coordinating Center</i>		
This laboratory course gives trainees hands-on experience in the differentiation of pluripotent stem cells into cardiac and vascular lineages. Dr. Huang is the instructor for this course.		
Role: Co-Investigator (Course Instructor)		
Postdoctoral Fellowship 1F32HL131114-01A1 (Nakayama)		9/1/16-1/13/18
NRSA Postdoctoral Fellowship		
Nanoscale Extracellular Matrix Alters Endothelial Function Under Disturbed Flow		
The aim is to evaluate the effect of disturbed flow on matrix-aligned endothelial cell morphology, atheroprotective function, and identification of the signaling pathways that mediate flow-induced atheroprotective properties in matrix-aligned endothelial cells. These findings are applied to evaluate the role of matrix-aligned endothelial cells in resisting atherosclerotic lesion formation <i>in vivo</i> .		
Role: Mentor		
W81XWH-16-C-0009 SBIR Phase II, Subaward of Fibralign	(Huang)	1/1/16-12/31/17
Department of Defense		
The plasmid-seeded aligned nanofibrillar scaffold to promote angiogenesis		
Aim is to evaluate the angiogenic capacity of scaffolds conjugated with mmRNA HGF upon transplantation into the ischemic limbs of mice. Aim 2 is to evaluate the improvement in skeletal muscle function using scaffolds conjugated with mmRNA HGF upon transplantation into a muscle void space after chronic volumetric muscle loss in mice.		
Stanford Women & Sex Differences in Medicine Seed Grants (Huang)		1/1/17-12/31/17
Sex Differences in Insulin Resistance: Probing the Contribution of Hormones to Endothelial Dysfunction Using Stem Cell-Derived Endothelial Cell		
Aim 1 is to compare the functional phenotype of iPSC-ECs isolated from men and women with insulin resistance before and after treatment with estrogen or testosterone. In the second aim, in a murine model of PAD, we will compare the therapeutic effect of iPSC-ECs generated from postmenopausal women with insulin resistance before and after treatment with estrogen or testosterone.		
R00 HL098688	(Huang)	9/1/10 – 2/28/18NCE
NIH / NHLBI		
Matrix-Mediated Endothelial Differentiation of Induced Pluripotent Stem Cells		
The aims are to develop a high-throughput ECM microarray to optimize the efficiency of human iPSC differentiation into ECs, and determine the role of ECM-integrin interactions in the differentiation process; to identify ECMs that best promote survival and phenotype of iPSC-derived ECs in hypoxia, and define signaling pathways that modulate the process; and to determine the therapeutic potential of iPSC-derived ECs in ECM for treatment of PAD.		
Child Health Research Institute, Pilot Seed Grant (Huang)		3/1/17-2/28/18
Bilayered Nanofibrillar Vascular Graft for Treatment of Congenital Heart Defect		
We propose to develop an iPSC-derived nanopatterned vascular graft with improved patency and can ultimately grow with the patient. Accordingly, we will generate an aligned vascular graft and quantify the effect		

of aligned nanofibrillar patterning in resisting inflammation and maintaining patency in vitro as well as in an interpositional graft in a rat model.

R21 EB020235-01 (Heilshorn/Huang PD/PIs)
NIH/NIBIB

7/15/15-6/30/18 NCE

Injectable Hydrogels to Improve the Efficacy of iPSC-derived Therapies

The objective is to engineer completely defined and injectable hydrogels that (i) provide protection from the mechanically disruptive forces experienced during syringe-needle flow; (ii) enable human iPSC-EC proliferation and spreading; (iii) are biodegradable and biocompatible; (iv) have controllable mechanical stiffness; and (v) provide sustained release of pro-survival factors. These properties will mechanically shield the cells from shear forces during injection, as well as provide ideal cell-adhesive matrix ligands, material stiffness, and soluble cues to promote cell survival after injection.

R01HL142718 (Huang/Heilshorn MPI) 7/1/18-3/31/22 2.4 calendar
NIH / NHLBI \$250,000

Engineered Matrix Microarrays to Enhance the Regenerative Potential of iPSC-Derived Endothelial Cells

We propose to develop a combinatorial family of engineered ECMs (eECMs) with independently tunable biochemical and biomechanical cues, including stiffness and stress relaxation rate for high-throughput, matrix array studies of induced pluripotent stem cell-derived endothelial cell (iPSC-EC) survival and angiogenic potential. The optimally designed eECMs will then be coinjected with iPSC-EC for treatment of peripheral arterial disease in a mouse model of hindlimb ischemia.

C. MENTORING HISTORY

2002-2006 Mentees at UC Berkeley

Present Location

Grace Young (Bioengineering undergrad)	Biotech industry
Maelene Wong (Bioengineering undergrad)	Postdoctoral Fellow at UC Davis
Amy Lam (Bioengineering undergrad)	Industry
Dolly Thomas (Biology graduate student)	Industry
Isabel Leong (Bioengineering undergrad)	Postdoc, Columbia University
April Wong (Bioengineering undergrad)	Biotech industry
Ryan Hoshi (Bioengineering undergrad)	PhD candidate at Northwestern University
Daniel Kim (Molecular Cell Biology undergrad)	Industry
Gary Yu (Bioengineering undergrad)	Medical school

Past Mentees

Present Location

2007-2008 Sina Jame (Medical student)	Internist, Univ California San Francisco
2008-2010 John Sun (Biology undergrad)	Research Assistant at Stanford University
2009-2011 Jerry Lee (Research Assistant)	Research Fellow, Harvard University
2009-2011 Janet Nnenda Okogbaa (Research Assistant)	Medical school, Stanford University
2011-2013 Edwina Lai (Chemical Eng grad student)	Industry
2011- 2013 Arshi Jha (Research Assistant)	Industry
2012-2013 Maggie Ostrowski (Chemical Eng grad student)	Industry
2015-2016 Brian Boursiquot (Stanford medical student)	
2014-2016 Zachary Strassberg (Research Assistant)	Industry
2014-2015 Prajakta Joshi (Research Assistant)	Industry (Bristol Myers Squibb)
2015-2016 Joseph J. Kim (Postdoc)	Industry (Theranos)
2017 Melody Dong (Bioengineering Graduate)	Rotation Student)
2013-2017 Luqia Hou (Postdoc)	Merck & Co
2017 Nicholas McMenemy (Summer Intern)	San Jose State University
2018 Adam Davies (Summer Intern)	University of California Davis
2016-2018 Guang Yang (Postdoc)	University of Maryland (Postdoc)

2012- Present Mentees

2013-Present Karina Nakayama (Postdoctoral Fellow)
2014-Present Nick Mezak (Undergraduate Research Assistant)
2015-Present Maureen Wanjare (Postdoctoral Fellow)
2016-Present Cynthia Alcazar (Research Assistant)
2016-Present Zhuoran Ma (Chemistry Graduate Student)
2017-Present Ada Undieh (Chemical Engineering Graduate Student)
2017-Present Maedeh Zamani (Postdoctoral Fellow)
2017-Present Esra Karaca (Postdoctoral Fellow)
2018-Present Frank Charbonier (Mechanical Engineering PhD Candidate)

Teaching

Fall 2017	Course Instructor	MED 223: Cardiovascular and Pulmonary Sciences Seminar
Winter 2017	Course Instructor	MED 223: Cardiovascular and Pulmonary Sciences Seminar
Fall 2018	Course Instructor	MED 223: Cardiovascular and Pulmonary Sciences Seminar