

# Rebecca L. Heise, Ph.D.

ASSISTANT PROFESSOR, DEPARTMENT OF BIOMEDICAL ENGINEERING  
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## EDUCATION

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*Doctor of Philosophy* in Bioengineering  
2008

**University of Pittsburgh**

Dissertation title: Strain Induced Remodeling of Urinary Bladder Smooth Muscle  
Advisor: Michael S. Sacks, Ph.D.

*Bachelor of Science* in Chemical Engineering  
2003

*Bachelor of Science* in Biomedical and Health Engineering  
2003

**Carnegie Mellon University**

## PROFESSIONAL EXPERIENCE

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**Assistant Professor** (Affiliate Appointment) 2013-Present  
Department of Physiology and Biophysics, Virginia Commonwealth University

**Assistant Professor** November 2010- Present  
Department of Biomedical Engineering, Virginia Commonwealth University

**Postdoctoral Fellow** August 2008-October 2010  
Laboratory of Respiratory Biology, National Institute of Environmental Health Sciences

**Graduate Student Researcher** July 2003-June 2008  
Department of Bioengineering, University of Pittsburgh

PEER REVIEWED PUBLICATIONS (Name Change Rebecca A. Long to Rebecca L. Heise in 2008) Students indicated with a \*.

H-index =7. Citation times from ISI Web of Science when available, Google Scholar otherwise

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Complete List of Published Work in Google Scholar:

[https://scholar.google.com/citations?hl=en&user=17XOn9UAAAAJ&view\\_op=list\\_works](https://scholar.google.com/citations?hl=en&user=17XOn9UAAAAJ&view_op=list_works)

1. Link PA\*, Pouliot RA\*, Mikhaeil N\*, Young BM\*, and **Heise RL**. "Formation of 3D Hydrogels from Lung Acellular Matrix" Invited Submission Journal of Visualized Experiments. In Press. Impact Factor: 1.1, Number of times cited: 0
2. **Heise RL**, Link PA\* and Farkas L. "From here to there, stem cells are everywhere (in lung vascular remodeling)" Invited Review Frontiers in Pediatrics online proof available August 1, 2016
3. Herbert JA\*, Valentine MS\*, Schneck MB\*, Fowler AA, Reynolds A, Pidaparti R, **Heise RL** "Conservative Fluid Management Prevents Age-Associated Ventilator Induced Mortality" (In Press) Available online 14 May 2016 Experimental Gerontology 5 Year Impact Factor: 3.802, Number of times cited: 0
4. Pouliot RA\*, Link PA\*, Mikhaeil NS\*, Schneck MB\*, Valentine MS\*, Kamga Gninzeko FJ\*, Herbert JA\*, Sakagami M, **Heise RL**, "Development and Characterization of a Naturally Derived Lung Extracellular Matrix Hydrogel" (2016) Journal of Biomedical Materials Research Epub Ahead of Print. PMID: 27012815 5 Year Impact Factor: 3.369, Number of times cited: 2
5. Stober VP, Szczesniak C, Childress Q, **Heise RL**, Bortner CD, Hollingsworth JW, Neuringer IP, Palmer

- SM, Garantziotis S “Bronchial Epithelial Injury in the Context of Alloimmunity Promotes Lymphocytic Bronchiolitis through Hyaluronan Expression.” (2014) Am J Physiol Lung Cell Mol Physiol. 2014 June; 306 (11),L1045-L1055. PMID: 24748604. 5 year Impact Factor: 4.338, Number of times cited: 4
6. Pidaparti RM, Burnette M, **Heise RL** and Reynolds A “Analysis of Stress Environment in the Alveolar Sac Model, Journal of Biomedical Science and Engineering. (2013) DOI: 10.4236/jbise.2013.69110, pp. 901-907, September 20. Impact Factor: 0.81, Number of times cited: 0
  7. **Heise RL**, Parekh A, Joyce EM, Chancellor MB, and Sacks MS. “Strain history and TGF- $\beta$ 1 induce urinary bladder wall smooth muscle remodeling and elastogenesis” (2012) Biomechanics and Modeling in Mechanobiology. January 11(1-2):131-145. 5 year impact factor: 3.540 Number of times cited: 3
  8. **Heise RL**, Stober V, Cheluvvaraju C, Hollingsworth JW, and Garantziotis S. “Mechanical Stretch Induces Epithelial to Mesenchymal Transition of Alveolar Type II Epithelium Through Hyaluronan Expression and Innate Immune Activation.” (2011) Journal of Biological Chemistry. May 20;286(20):17435-44 5 year impact factor 5.01, Number of times cited: 39
  9. Parekh A, Cigan AD, Wognum S, **Heise RL**, Chancellor MB, Sacks MS. “Ex Vivo Deformations of the Urinary Bladder Wall During Whole Bladder Filling: Contributions of Extracellular Matrix and Smooth Muscle.”(2010) Journal of Biomechanics. June;43(9):1708-1716. 5-Year Impact Factor: 3.14. Number of times cited: 14
  10. **Heise RL**, Ivanova J, Parekh A, and Sacks MS. “Generating Elastin-Rich SIS-Based Smooth Muscle Constructs Utilizing Exogenous Growth Factors and Cyclic Mechanical Stimulation.” (2009) Tissue Engineering. Dec;15(12):3951-60. Impact factor: 4.64. Number of times cited: 17  
**\*Research Highlight “Regenerative medicine: Advances in bladder tissue engineering” Nature Reviews Urology (2009) September 6, 466**
  11. Parekh A, **Long RA**, Iannone EC, Chancellor MB, and Sacks MS. “Assessing the Effects of TGF-B1 on Bladder Smooth Muscle Cell Phenotype. I. Modulation of in vitro Contractility.” (2009) Journal of Urology. Sep;182(3):1210-15. 5 year impact factor: 3.902. Number of times cited: 12
  12. Parekh A, **Long RA**, Chancellor MB, and Sacks MS. “Assessing the Effects of TGF-B1 on Bladder Smooth Muscle Cell Phenotype. II. Modulation of Collagen Organization.” (2009) Journal of Urology. Sep;182(3):1216-21. 5 year impact factor: 3.902. Number of times cited: 9
  13. Merryman WD, Lukoff HD, **Long RA**, Engelmayr Jr GC, Krueger PM, Hopkins RA, and Sacks MS. “Synergistic Effects of Cyclic Tension, Transforming Growth Factor- $\beta$ 1, and the Aortic Valve Myofibroblast.” (2007) Cardiovascular Pathology. Sep-Oct;16(5):268-76. 5-Year Impact Factor: 2.119, Number of Times Cited: 66
  14. **Long RA**, Nagatomi. J, Chancellor MB, and Sacks MS. “The Role of MMP-I Up-regulation in the Increased Compliance in Muscle-derived Stem Cell-seeded Small Intestinal Submucosa.” (2006) Biomaterials. Apr;27(11):2398-404. Impact Factor: 8.312. Number of times cited: 13

## MANUSCRIPTS SUBMITTED

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1. Farkas D, Kraskauskienė V, Kraskauskas D, Dandamudi K, Drake J, **Heise RL**, Natarajan R, Cool C, Farkas L. “Nestin regulates cell growth in Bone Marrow-derived Mesenchymal Stem Cells and pulmonary arteries of rats with severe Pulmonary Arterial Hypertension.” AJP Lung (Submitted August 1, 2016)

- Herbert J\*, Valentine M\*, Patel P\*, Pidaparti R, Reynolds A, **Heise R.L.** “Age and Mechanical Stretch Increase Inflammatory Gene Expression and ER Stress in In Vitro Models of Lung Injury” Thorax (Submitted August 16, 2016)
- Kim JW, **Heise RL**, Reynolds AM, Pidaparti RM, “Aging Effects on Airflow Dynamics and Lung Function in Human Bronchioles” PLOSOne (Submitted September 20, 2016)

#### MANUSCRIPTS IN PREPARATION

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- Heise RL**, Pidaparti R, Cooper R, Herbert JA\*, Fowler AA, Reynolds A. “Agent Based Modeling of Strain-Induced Lung Inflammation” PLOS One
- Young, BM\*, Blakeney BA\*, Allen, BP\*, **Heise, R. L.** “Decellularized Lung Extracellular Matrix Electrospun with Poly-L-lactic Acid for Tissue Engineering” Biomaterials
- Patel S\*, Radhika M\*, Garantziotis S, Natarajan R, **Heise RL**. “Primary Cilia Mechanotransduction in Lung Adenocarcinoma Cells” (In Preparation)
- Ratti JA\*, Reynolds A, **Heise RL** “A Computational Model of Lung Fibroblast Migration with In Vitro Validation” (In Preparation)

#### BOOK CHAPTERS

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- Heise RL**, Blakeney BA\*, Pouliot RA\* “Polymers in Tissue Engineering” Advanced Polymers in Medicine 2015 Springer International Publishing
- Heise RL**, Link PA\* “Lung Tissue Engineering” Tissue Engineering for Artificial Organs Wiley-VCH (In Press).

#### REFEREED CONFERENCE PROCEEDINGS

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- Herbert J, Valentine M, Patel P, Pidaparti R, Reynolds A, **Heise R.L.** Age and Mechanical Stretch Increase Inflammatory Gene Expression and ER Stress in In Vitro Models of Lung Injury, Abstract for poster presentation, Biomedical Engineering Society, 2015; Tampa, FL.
- Herbert J, Valentine M, Patel P, Pidaparti R, Reynolds A, **Heise R.L.** Aging and Mechanical Stretch Increase Inflammatory Gene Expression and ER Stress in In Vitro and In Vivo Models of Lung Injury, Abstract for talk, Gordon Research Seminar, Abstract for Poster, Gordon Research Conference: Lung Injury, Development & Repair, 2015; Andover, NH.
- Mikhael N. S. , Pouliot R. A. , Link P. A. , **Heise, R. L** (2015). Utilizing Natural Crosslinking Molecules to Improve Stiffness of Lung Derived Extracellular Matrix Hydrogels. Biomedical Engineering Society
- Pouliot, R. A. , Link P. A. , Mikhael N. S. , Takahashi R.A, **Heise, R.L** (2015). Extracellular Matrix Hydrogels from Decellularized Lung Tissue. Gordon Research Conference
- Pouliot, R. A., Mikhael N. S., Wong B. , **Heise R. L** (2015). ECM Hydrogels from Decellularized Tissue. Society for Biomaterials, Charlotte, NC
- Young, B. M., Blakeney B. A., Allen, B. P., Schreyack, G. E., Pouliot, R. A., **Heise, R. L** (2015). Decellularized Lung Extracellular Matrix Electrospun with PolyLlactic Acid for Tissue Engineering. Biomedical Engineering Society Meeting. Tampa, FL
- Brittany P. Allen, Bryan A. Blakeney, Bethany M. Young, Robert A. Pouliot, **Rebecca L. Heise** (2015). Creating a Scaffold for Lung Modeling and Regeneration. 19th Annual Poster's on the Hill
- Brittany P. Allen, Bethany M. Young, Bryan A. Blakeney, Robert A. Pouliot, **Rebecca L. Heise** (2015). Creating a Hybrid Scaffold for Lung Modeling and Regeneration. Biomedical Engineering Society
- Herbert J, Valentine M, Patel P, Reynolds A, Pidaparti R, **Heise R.** Age Related Changes in Pulmonary Mechanics and Inflammatory Response to Experimental Ventilator Induced Lung Injury, Presented at the

- Biomedical Engineering Society Meeting, San Antonio, TX October 23-25, 2014
10. Nkwocha J., Herbert J., Reynolds A, **Heise R.** Mechanical Stretch and Aging of Alveolar Epithelial Cells induces Endoplasmic Reticulum Stress and Pro-inflammatory Gene Expression, Presented at the Biomedical Engineering Society Meeting, San Antonio, TX October 23-25, 2014
  11. Blakeney BA, Schreyack G, Pouliot R, **Heise R.** Mechanical Properties Of Decellularized Lung Extracellular Matrix Tissue Scaffold Electrospun With PLLA, Presented at the Biomedical Engineering Society Meeting, San Antonio, TX October 23-25, 2014
  12. Pouliot R, Takahashi R, Malik M, **Heise R.** Mechanical Properties and Gelation Kinetics of Lung ECM Hydrogels Tailored for Regenerative Medicine, Presented at the Biomedical Engineering Society Meeting, San Antonio, TX October 23-25, 2014
  13. Pidaparti R., **Heise R.**, Cooper R., Rolle T., Reynolds A.. Multiscale Model of Lung Inflammation, Presented at the Biomedical Engineering Society Meeting, San Antonio, TX October 23-25, 2014
  14. Herbert J, Valentine M, Patel P, Pidaparti R, Reynolds A, **Heise R.** The Effect of Age on the Severity of Ventilator Induced Lung Injury in an Aging Mouse Model. Poster session presented at: Critical Illness: Novel Molecules and Models. Annual international conference of the American Thoracic Society; May 16- 21, 2014; San Diego, CA.
  15. Reynolds AM, Pidaparti RM, **Heise RL**, Multi-Scale Modeling Framework for Lung Tissue Inflammation (Poster) Gordon Research Conference, Lung Development, Injury & Repair, August 18-23, 2013
  16. Pouliot, R. A., Takahashi R.A, Malik, M., **Heise, R.L**, Lung Derived Extracellular Matrix Hydrogels Conduct Attachment, Proliferation, and Fate of Progenitor and Terminal Lung Cell Types, Presented at the Biomedical Engineering Society Meeting, Seattle, Washington, September 27, 2013
  17. Takahashi, R. A., R. A. Pouliot,., **Heise RL**. Decellularized Extracellular Matrix Therapy for Treatment of Diseased Human Bronchial Epithelial Cells with COPD, Presented at the Biomedical Engineering Society Meeting, Seattle, Washington, September 28, 2013
  18. Herbert J, Venkatasubramanian A, Pidaparti R, Reynolds A, **Heise R.** The Effect of Age on the Severity of Ventilator Induced Lung Injury in an Aging Mouse Model. Session talk presented at: Ventilation and Ventilation-Induced Injury. Annual international conference of the Biomedical Engineering Society; 2013 September 25-28, 2013; Seattle, WA.
  19. **Heise RL**, Pidaparti RM, Reynolds AM, Multi-Scale Modeling of Lung Inflammation (Mini- symposium talk) Biomathematics Ecology: Education and Research Conference, October 2013
  20. **Heise RL**, Reynolds, AM, Agent Modeling of Stretch-Induced Immune Cell Recruitment (Contributed talk) SIAM: South Eastern Atlantic Sectional Conference, March 2014
  21. Herbert J, Valentine M, Patel P, Pidaparti R, Reynolds A, **Heise R.** The Effect of Age on the Severity of Ventilator Induced Lung Injury in an Aging Mouse Model. Poster session presented at: Critical Illness: Novel Molecules and Models. Annual international conference of the American Thoracic Society; May 16- 21, 2014; San Diego, CA.
  22. Cooper R, Pidaparti RM, **Heise RL**, Reynolds, AM Agent Based Modeling of Strain-Induced Lung Inflammation (Podium Presentation) WCB: World Congress of Biomechanics Conference, July 2014, Boston, MA
  23. R. Pouliot, BS, M. Malik, BS, **Heise RL** , Ph.D. Lung Tissue Derived Extracellular Matrix Hydrogels Promote Mouse Mesenchymal Stem Cell Proliferation, Attachment, And Differentiation Podium Presentation at the American Thoracic Society Meeting, May 21, 2013, Philadelphia PA
  24. Pouliot R, **Heise RL** “Lung derived extra cellular matrix hydrogels conduct pulmonary epithelial cell growth” Poster presented at the BMES Annual Meeting, October 24-27, 2012 in Atlanta, Georgia
  25. Malik M, Pouliot R, **Heise RL** “Mouse Derived Extracellular Matrix Hydrogels Improve Mesenchymal Stem Cell Attachment” Poster presented at the BMES Annual Meeting, October 24-27, 2012 in Atlanta, Georgia
  26. Patel P, **Heise RL** “Mechanical Stretch-Induced Damage in Human Bronchial Epithelial Cells” Poster presented at the BMES Annual Meeting, October 24-27, 2012 in Atlanta, Georgia
  27. Venkatasubramanian V, Herbert J, **Heise R** “Mechanical stretch-induced inflammation: human bronchial

- epithelial and murine type II alveolar cells” Poster presented at the BMES Annual Meeting, October 24-27, 2012 in Atlanta, Georgia
28. Pouliot R; Malik M; **Heise RL**, “Lung Derived Extra Cellular Matrix Hydrogels Conduct Mesenchymal Cell Growth, Attachment, and Differentiation” Poster presented at the Seventeenth Annual Hilton Head Workshop, "Regenerative Medicine: Technologies Enabling Novel Therapies," March 20-23, 2013 Sea Pines Resort, SC
  29. M.R. Radhika, S. Patel, **R.L. Heise**, Primary Cilia And Smoothed Inhibition In Non-Small Cell Lung Cancer, Poster Presented at the American Thoracic Society Meeting, May 22, 2013, Philadelphia PA
  30. J.A. Herbert, A. Venkatasubramanian, R.M. Pidaparti, A.M. Reynolds, **Heise R.L.**, The Effect Of Age On The Severity Of Ventilator Induced Inflammation In Alveolar Type II Epithelia Poster Presented at the American Thoracic Society Meeting, May 20, 2013, Philadelphia PA
  31. Patel S, Natarajan R, **Heise RL**. “The Importance Of Primary Cilia In Lung Adenocarcinoma Tumor Progression” Presented at the American Thoracic Society Meeting on May 23, 2012. San Francisco, CA
  32. Patel S, **Heise RL** “Primary Cilia Mechanotransduction in Lung Adenocarcinoma Cells” BMES Meeting October 14, 2011. Hartford, Connecticut.
  33. Patel S, Natarjan R, **Heise RL**. “MECHANOTRANSDUCTION OF PRIMARY CILIA IN LUNG ADENOCARCINOMA” ASME Summer Bioengineering Conference June 21, 2012. Fajardo, Puerto Rico
  34. Patel S, **Heise RL**, Primary cilia mechanotransduction in lung adenocarcinoma cells. *To be presented at the Biomedical Engineering Society Meeting in Hartford, Connecticut, October 12-15, 2011.*
  35. **Heise RL**, Garantziotis S, Alveolar Epithelial Cells Respond to Mechanical Stretch Through Primary Cilia Formation. *Presented at the Biomedical Engineering Society Meeting in Austin, Texas, October 6-10, 2010. abstract published on CD-ROM.*
  36. **Heise RL**, Li M, Stober V, Garantziotis S. Hyaluronan Causes Airway Smooth Muscle Contraction in Asthma. *Presented at the American Thoracic Society Meeting, New Orleans, Louisiana, May 16, 2010. Abstract published in AJRCCM.*
  37. **Heise RL**, Stober V, Hollingsworth JW, Garantziotis S. Mechanical Strech Induces Epithelial to Mesenchymal Transition Through Hyaluronan Expression and Innate Immue Activation. *Presented at the American Thoracic Society Meeting, New Orleans, Louisiana, May 16, 2010. Abstract published in AJRCCM.*
  38. **Heise RL** and Garantziotis S. Mechanical stretch induces epithelial to mesenchymal transition in alveolar type II epithelium via hyaluronan expression. *Presented at the Biomedical Engineering Society Meeting, Pittsburgh, Pennsylvania, October 9, 2009.*
- Name Change Rebecca A. Long to Rebecca L. Heise in 2008**
39. **Long RA**, Palmer SM, Snyder LD, Stober V, Hollingsworth JW, Li Z, Jiang D, Noble PW, Garantziotis S. Bronchial Epithelial Injury In The Context of Alloimmunity Promotes Lymphocytic Bronchiolitis via Hyaluronan. *Presented at the American Thoracic Society Meeting, San Diego, California, May 20, 2009. Abstract published in AJRCCM.*
  40. **Long RA**, Parekh A, and Sacks, MS. Strain induced bladder remodeling. *Presented at the Biomedical Engineering Society Conference, Los Angeles, California, September 29, 2007.*
  41. **Long RA**, Parekh A, Chancellor MB, and Sacks MS. An Ex Vivo Model for Strain Induced Bladder Smooth Muscle Remodeling. *Presented at the Engineering and Urology Society, Anaheim, California, May 19, 2007.*
  42. **Long RA**, Parekh A, Chancellor MB, and Sacks MS. Response of bladder smooth muscle cells to contact guidance and mechanical stimulation. *Presented at the Engineering and Urology Society, Anaheim, California, May 19, 2007.*
  43. **Long RA** and Sacks MS, The effect on contact guidance and mechanical stretch on bladder smooth muscle cell alignment. *Presented at the ASME Summer Bioengineering Conference, Amelia Island, Florida on June 23, 2006, abstract published on CD-ROM.*
  44. **Long RA**, Huard J, Chancellor M, and Sacks MS, The effect of substrate on muscle derived stem cell

differentiation, *Presented at the Society for Biomaterials 2006 Annual Meeting, Pittsburgh, Pennsylvania, on April 27, 2006*, abstract published on CD-ROM.

45. **Long RA**, Ivanova JS, Parekh A, and Sacks MS, Exogenous Growth Factors Enhance Bladder Wall Smooth Muscle Cell Ingrowth into Small Intestinal Submucosa. *Presented at the Biologic Scaffolds For Regenerative Medicine 5<sup>th</sup> Symposium, Phoenix, Arizona, on February 15, 2008*.
46. **Long RA**, Parekh A, Chancellor MB, and Sacks MS, Bladder Smooth Muscle Cell Responses to Contact Guidance and Biaxial Mechanical Stretch. *Presented at the Society for Biomaterials 2007 Annual Meeting, Chicago, Illinois on April 20, 2007*, abstract published on CD-ROM
47. **Long, RA**, Nagatomi, J, Chancellor, MB, Sacks, MS, MMP-I is a potential mechanism responsible for increased compliance in muscle-derived cell-seeded SIS for urologic tissue engineering applications, *Presented at the 2005 Society for Biomaterials Conference, Memphis, Tennessee, on April 29, 2005*
48. **Long RA**, Huard J, Chancellor M, and Sacks MS, The effects of substrate choice on muscle derived stem cells in vitro, *Presented at the Tissue Engineering Society International Meeting, Shanghai, China, on October 21, 2005*, abstract published on CD-ROM.

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## INVITED TALKS

1. "Extracellular Matrix Strategies for Lung Modeling and Repair", First Colony Scientific Retreat, May 27, 2016
2. "The Interplay Between Mechanical Strain and Aging in Ventilator Induced Lung Injury", Harvard School of Public Health Seminar, March 23, 2016
3. "Discovering Ways to Regenerate the Damaged Lung", Center for Clinical and Translational Research's Discovery Dialogues, December 14, 2015
4. "Presenting at a Scientific Meeting", VCU Honors College, June 25, 2014
5. "Mechanically activated cell signaling in lung disease", Department of Physiology and Biophysics Seminar, VCU, March 6, 2014
6. "Pulmonary Mechanobiology: Role in Lung Cancer and Acute Lung Injury" Institute for Engineering and Medicine Breakfast Club Seminar, VCU, Wednesday, October 16, 2013
7. "Mechanobiology Approaches to Lung Injury", Pulmonary and Critical Care Medicine Seminar Series, VCU, October 7, 2013
8. "Primary cilia signaling in non-small cell lung cancer", VCU, MD/PhD Seminar Series, September 10, 2013
9. "Primary Cilia Mechanotransduction" Laboratory of Respiratory Biology, National Institute of Environmental Health Sciences, Research Triangle Park, NC, December 5, 2012
10. "Hyaluronan/Inter-alpha-inhibitor blockade abolishes airway hyperresponsiveness in asthma" Allergy Division, National Institute of Allergy and Infectious Disease, Bethesda, MD, June 10, 2010.
11. Mechanical stretch induces epithelial to mesenchymal transition in alveolar type II cells through hyaluronan expression" Duke Airway Biology Forum, Durham, NC, October 30, 2009.
12. Panelist on Ethical Issues in Genomics and Privacy in a session entitled "New Technologies, New Questions" at the Mid-Atlantic Regional Student Pugwash Conference. Pittsburgh, PA, March 30, 2007.
13. Radio Interview on Advances in Tissue Engineering on "The World Revealed" on WRCT. April 30, 2006

## CURRENT SUPPORT

(\$1,158,000 current and past support directly attributable out of \$2,002,000 total support obtained)

Title: CAREER: Propagation of Lung Fibrosis through Mechanotransduction CMMI-135162

Agency: National Science Foundation

Role: PI

Initiation Date:2/2014  
Termination Date:1/2019  
Total Award Amount: \$400,000  
Funding Attributable to Heise: \$400,000

Title: Age Dependent Mechanical Ventilator-Induced Inflammation: Modeling and Experiments  
1R01AG041823-01A1 (MPI)  
Agency: National Institutes of Health  
Role: PI  
Initiation Date: 8/1/12  
Termination Date:5/31/16 (No Cost Extension Granted, 5/31/17)  
Total Award Amount: \$1,200,000  
Funding Attributable to Heise: \$400,000  
Collaborators: Angela Reynolds, Ramana Pidaparti, Alpha Fowler

Title: Developing a Practical Delivery Device and Animal Proof-of-Concept Data for a New Inhaled Surfactant Therapy Developed at VCU  
Agency: VCU PERQ  
Role: Co-PI  
Proposed Initiation Date: 7/1/2016  
Proposed Award Amount: \$50,000  
Proposed Funding Attributable to Heise: \$25,000  
Collaborator: P. Worth Longest

#### PENDING SUPPORT

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Title: High Efficiency Delivery of Surfactant Aerosols to Infants during Noninvasive Ventilation  
Agency: National Institutes of Health  
Role: Co-I  
Proposed Initiation Date: 9/1/2016  
Proposed Award Amount: \$2,000,000  
Proposed Funding Attributable to Heise: \$80,000  
Grant PIs: P. Worth Longest, Michael Hindle

Title: Extracellular Matrix Based Nanocarriers for Pulmonary Drug Delivery  
Agency: National Institutes of Health  
Role: PI  
Proposed Initiation Date: 9/2016  
Proposed Termination Date: 8/2018  
Proposed Award Amount: \$275,000  
Proposed Funding Attributable to Heise: \$255,000  
Collaborators: Masahiro Sakagami, Daren Chen

#### PRIOR SUPPORT

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Title: Development of Extracellular Matrix Hydrogels for Lung Regeneration 236-05-13  
Agency: Commonwealth Health Research Board  
Role: PI  
Initiation Date: 7/2013  
Termination Date: 7/2015

Total Award Amount: \$200,000  
Funding Attributable to Heise: \$185,000  
Collaborators: Masahiro Sakgami, Norbert Voelkel

Title: "Ascorbic Acid Infusion to Attenuate Stretch Induced Lung Injury In Murine Lung" ULITR000058  
Agency: National Center for Advancing Clinical and Translational Studies  
Role: Co-I  
Initiation Date: 6/13  
Termination Date: 12/14 Total Award Amount: \$32,000  
Funding Attributable to Heise: \$28,000  
Grant PI: Alpha Fowler

Title: "Primary cilia mechanotransduction in non-small cell lung cancer." J-1029  
Agency: Thomas F. and Kate Miller Jeffress Memorial Trust  
Role: PI  
Initiation Date: 7/1/2011  
Termination Date: 6/30/15  
Total Award Amount: \$45,000  
Funding Attributable to Heise: \$45,000

Title: "Primary Cilia Mechanical Signaling in Non-Small Cell Lung Cancer"  
Agency: American Cancer Society Institutional Research Grant  
Role: PI  
Dates Active:07/2011-01/2013  
Award Amount: \$25,000  
Amount Attributable to Heise: \$25,000

Title: "Mechanisms of mechanical stretch induction of alveolar epithelial to mesenchymal transition."  
Agency: Virginia Commonwealth University Presidential Research Incentive Program Award.  
Role: PI.  
Dates Active 07/2011-01/2013  
Amount \$50,000  
Funding Attributable to Heise: \$50,000

#### INVENTION DISCLOSURES

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"Extracellular Matrix Nanoparticles of Pulmonary Drug Delivery" April 2016  
"Sliding window stent loader" April 2014  
"Transparent temperature-controlled cell stretching attachment for live cell imaging" April 2012

#### CONSULTING ACTIVITIES

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2013, 2014 Periodic paid grant reviewer for the Virginia Tobacco Idemnification Commission  
2016 Grant Reviewer for Marzden Fund, Royal Society of New Zealand

#### GRADUATE RESEARCH ADVISEES WHO HAVE COMPLETED DEGREES

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<b>Student</b>	<b>Degree</b>	<b>Entry Date</b>	<b>Completed Date</b>	<b>Research Topic</b>	<b>Current Position</b>
Robert Pouliot	PhD	Fall 2011	Aug 2016	Lung ECM hydrogels	Postdoc- University of Vermont



Joseph Herbert	PhD	Fall 2011	Aug 2016	Aging and Ventilator Induced Lung Injury	Postdoc – Duke University
Bethany Young	MS	Fall 2014	2016	Electrospun lung ECM constructs	Staying for PhD
Monika Radhika	MS	Fall 2011	2015	Primary cilia and lung cancer	Lab tech
Sagar Patel	MS	Fall 2010	2013	Primary cilia in lung cancer	USPTO

**UNDERGRADUATE RESEARCH ADVISEES WHO HAVE COMPLETED DEGREES (Selected students out of 18 total undergraduates mentored for 1 semester or more)**

<b>Student</b>	<b>Degree</b>	<b>Degree Date</b>	<b>Research Topic</b>	<b>Current Position</b>
Brittany Allen	BS	2016	Electrospun scaffolds	Johns Hopkins MS
Nabil Mikhaiel	BS	2016	Lung ECM hydrogels	Franchise owner
Jewel Nkwocha	BS	2015	Lung cell stretch	Lab technician VCU Massey Cancer Center
Shane Diller	BS	2014	Bioreactor design	Steward school faculty
Gretchen Schreyak	BS	2014	Electrospun scaffolds	U Memphis MS
Rachel Takahashi	BS	2014	Device design	Design Engineer at Cognionics
Meher Malik	BS	2014	Lung ECM hydrogels	VCU Medical School
Dustin Jones	BS	2013	Polymeric hydrogels	Johns Hopkins PhD
Kevin Lessard	BS	2012	Lung mechanobiology	Process Engineer at Corium International

**RESEARCH ADVISEES**

<b>Student</b>	<b>Degree</b>	<b>Entry Date into Program</b>	<b>Completed Date</b>	<b>Research Topic</b>
Bethany Young	PhD	Fall 2016	ongoing	Lung tissue engineering
Patrick Link	PhD	Fall 2014	ongoing	ECM hydrogels for drug delivery
Alex Ratti	MS	Fall 2013	ongoing	Fibroblast response to cigarette smoke
Michael Valentine	PhD	Fall 2015	ongoing	Macrophages in mechanical ventilation
B. Adam Blakeney	MD/PhD	Fall 2013	ongoing	Role of laminin in lung fibrosis
Franck Kamga	BS	Fall 2013	Expected 2017	Inflammation in lung injury
Matthew Schneck	BS	Fall 2013	Expected 2017	Lung macrophage responses
Niraja Bohidar	BS	Fall 2013	Expected 2017	Ventilator induced lung injury
Gabrielle Cotmann	BS	Fall 2014	Expected 2018	Pulmonary drug delivery
Farhana Khan	BS	Fall 2014	Expected 2018	Vascular stem cells

**THESIS/DISSERTATION COMMITTEES**

<b>Student</b>	<b>Department</b>	<b>Degree</b>	<b>Year</b>
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Jiten Narang	Biomedical Engineering	PhD	ongoing
Thomas Petet	Biomedical Engineering	MS	ongoing
Michael Lancina	Biomedical Engineering	PhD	ongoing
Sneha Dhapare	Pharmaceutics	PhD	ongoing
Hsi-Wei Yeh	Mechanical and Nuclear Engineering	PhD	ongoing
Paul Arsenovic	Biomedical Engineering	PhD	ongoing
Racheal Cooper	Mathematics and Applied Mathematics	PhD	2016
Donald Aduba	Biomedical Engineering	PhD	2015
Leyuan Xu	Biomedical Engineering	PhD	2015
Lewis Scott	Biomedical Engineering	MS	2015
Casey Grey	Biomedical Engineering	PhD	2014
Joshua Lobo	Biomedical Engineering	MS	2014
Matthew Rajotte	Mathematics and Applied Mathematics	MS	2014
Seyed Omid Komari	Mechanical and Nuclear Engineering	PhD	2014
Kelly Morgan	Biomedical Engineering	MS	2014
Trenicka Rolle	Mechanical and Nuclear Engineering	MS	2014
Ross Walenga	Mechanical and Nuclear Engineering	PhD	2014
Isti Arief	Biomedical Engineering	PhD	2013
Cristofer Madera	Biomedical Engineering	MS	2013
Racheal Cooper	Mathematics and Applied Mathematics	MS	2013
Anna Bulysheva	Biomedical Engineering	PhD	2012
Gigi Meyer	Mathematics and Applied Mathematics	MS	2012
Nicole L O'Neil	Mathematics and Applied Mathematics	MS	2012
Patricia Wolfe	Biomedical Engineering	PhD	2011

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#### HONORS AND AWARDS BY STUDENTS UNDER MY MENTORSHIP

<b>Student</b>	<b>Date</b>	<b>Award</b>
Patrick Link	2016	NSF Graduate Research Fellowship Program
	2016	DURI Mentor
Niraja Bohidar	2016	UROP Summer Fellowship
Bethany Young	2015	DERI Mentor
B. Adam Blakeney	2016	WHBA Summer School 2016
Brittany Allen	2015	Posters on the Hill, Council on Undergraduate Research
	2015	Honors College Travel Grant
	2015	UROP Travel Grant
	2015	Scholarship for the Advancement of Women, VCU Business Services
	2015	UROP Summer Fellowship
Joseph Herbert	2014	BMES Graduate Student Travel Award
	2014	DURI Mentor
	2014	DERI Mentor

Robert Pouliot	2015	DURI Mentor
	2014	DERI Mentor

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#### LEADERSHIP/SERVICE POSITIONS

1. Mentor, American Thoracic Society, Respiratory Structure and Function 2016
2. Session Chair, Respiratory Engineering Track, Biomedical Engineering Society 2015
3. Session Chair, Multi-scale Modeling, Biomedical Engineering Society 2014
4. Session Chair, Respiratory Engineering Track, Biomedical Engineering Society 2014
5. Track Chair, Undergraduate Research, Biomedical Engineering Society 2011
6. NIEHS Career Fair Committee Member 2010
7. NIH Fellows Committee Representative for NIEHS 2009-2010
8. Bioengineering Graduate Student Representative, University of Pittsburgh 2006
9. Tissue Engineering and Regenerative Medicine International Society – Student and Young Investigator Section University of Pittsburgh Chapter Interim Networking Chair Spring 2006

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#### HONORS, AWARDS, AND FELLOWSHIPS

1. NSF CAREER Award, 2014
2. Blavetenik Young Scientists Nominee, 2013
3. VCU Pew Scholars in the Biomedical Sciences Nominee, 2013
4. VCU Pew Scholars in the Biomedical Sciences Nominee, 2012
5. Qimonda Discretionary Funds award, 2011
6. Selected to participate in the Second Annual NIH National Graduate Student Research Festival, Bethesda, MD, October 11 - 12, 2007.
7. Graduate Research Award, Biomedical Engineering Society 2007
8. Finalist, ASME Summer Bioengineering Conference PhD Competition, Keystone, Colorado, June 23, 2007.
9. McGowan Trainee Career Advancement Program Travel Award, Society for Biomaterials Meeting, Chicago, IL, April 18-21, 2007
10. NIH T32 Cellular Approaches to Tissue Engineering and Regeneration (CATER) Fellow 2004-2006
11. ORAU Delegate, 55<sup>th</sup> Annual Lindau Meeting of Nobel Laureates and Students, Lindau, Germany, June 25- July 1, 2005

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#### UNIVERSITY CENTER MEMBERSHIPS

- Massey Cancer Center
- The VCU Johnson Center for Critical Care and Pulmonary Research

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#### PROFESSIONAL SOCIETY MEMBERSHIPS

American Thoracic Society (ATS)  
Biomedical Engineering Society (BMES)  
Society for Biomaterials (SFB)

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#### UNIVERSITY, SCHOOL, AND DEPARTMENTAL SERVICE

##### UNIVERSITY

- CCTR Grant Reviewer 2016
- Center for Rehabilitation Science and Engineering (CERSE) Review Team Member 2016

- Equity Study Committee 2015-2016
- Department of Pharmaceutics Faculty Search Committee for Pharmaceutical Engineering Position 2015
- MD/PhD Steering Committee 2013-Present
- Internal Reviewer for Commonwealth Health Research Board Proposals 2014, 2015
- Mentor for Medical Sciences Internship Program 2011, 2012, 2013, 2014, 2015

#### SCHOOL

- Engineering Academic Ranking and Excellence (EARE) Committee 2016
- Coordinator for National Society for Blank Engineers Booth 2016
- Director of Project Outreach Search Committee 2015
- Advisor to Psi Sigma Rho Engineering Sorority 2015
- Liaison to the Women, War, and Peace Conference 2013
- PQRF proposal reviewer 2013

#### DEPARTMENT

- Chair, Faculty Search Committee 2016
- Chair, Ad Hoc Graduate Curriculum Revision Committee 2016
- Ad Hoc Committee on Senior Design 2015
- Department Chair Search Committee 2014
- Faculty Search Committee 2013
- Advisor to Biomedical Engineering Society Student Chapter 2013-present
- Faculty Search Committee 2012

#### COMMUNITY SERVICE

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- Baker Elementary School STEM Day 2014
- Engineering Girl Scouts Day 2013

#### MANUSCRIPT REVIEWS

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*ASME Journal of Biomechanical Engineering (5 times)*

*European Respiratory Journal (3 times)*

*Journal of Biomechanics (4 times)*

*Biomaterials (2 times)*

*PLOS-One (3 times)*

*Journal of Biomaterials and Tissue Engineering (1 time)*

#### GRANT REVIEWS

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NSF CMMI Biomechanics and Mechanobiology ( 3 panels)

NIH NIEHS (1 study section, ad hoc)

#### TEACHING EXPERIENCE

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##### **Virginia Commonwealth University**

**2011-Present**

*Professor for the following courses:*

EGRB 203 Introduction to Biomechanics (4 semesters)

EGRB 427 Biomaterials (1 semester)

EGRB 691 Cell Mechanics and Mechanobiology (1 semester)

EGRB 491 Cell Mechanics and Mechanobiology (2 semesters)

EGRB 401/402 Senior Design (10 semesters with 12 teams total)

EGRB 491 Pulmonary Regenerative Medicine (3 semesters)

##### **University of Pittsburgh**

Spring 2007

*Teaching Assistant:* Social, Political, and Ethical Issues in Bioengineering

**University of Pittsburgh**  
*Guest Lecturer:* Biomechanics of Organs, Tissues, and Cells

Spring 2006

**University of Pittsburgh**  
*Teaching Assistant:* Functional Tissue Engineering

Fall 2004

**Carnegie Mellon University**  
*Teaching Assistant:* Abnormal Psychology

Fall 2002