

# Rebecca R. Vanderpool, PhD

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## Chronology of Education

5/04 **B.S.** in Biomedical Engineering, University of Wisconsin – Madison, Madison, WI, USA

8/10 **Ph. D** in Biomedical Engineering, University of Wisconsin – Madison, Madison, WI, USA

Advisor: Naomi C. Chesler

Doctoral Dissertation: “Pulmonary physiology and pathophysiology in isolated mouse lungs: use of pressure-flow relationships to link pulmonary vascular function to pulmonary vascular mechanics and structure”

Major Field: Biomedical Engineering

## Chronology of Employment

9/04 – 5/06 Teaching Assistant, University of Wisconsin-Madison, Madison, WI, USA  
Classes: Introduction to Biomechanics (Fall 2004, 2005 & 2006), Introduction to Bioinstrumentation (Spring 2005), and Biofluidics (Spring 2005 & 2006)

6/05 – 8/10 Research Assistant, Department of Biomedical Engineering, University of Wisconsin – Madison, Madison, WI, USA. Advisor and Mentor: Naomi C. Chesler

1/10 - 5/10 Teaching Assistant, University of Wisconsin-Madison, Madison, WI, USA  
Class: Biofluidics

3/11 – 3/13 Post-doctoral Researcher, Department of Physiology, Université Libré de Bruxelles, Brussels, Belgium, Mentor: Robert Naeije

6/13 – 7/16 Post-doctoral Scholar, Pittsburgh Heart, Lung, Blood and Vascular Medicine Institute, University of Pittsburgh, Pittsburgh, PA, USA, Mentors: Mark T. Gladwin and Marc A. Simon

10/16 - Assistant Professor, Medicine, Division of Translational and Regenerative Medicine, Department of Medicine, University of Arizona

10/16- Research Assistant Professor, Department of Biomedical Engineering, University of Arizona

## Honors and Awards

2013- Fellow, Pulmonary Vascular Research Institute (member of the Committee for Young Clinicians and Scientists (CYCS)).

2013- Editorial Board Member, PVRI Chronicle

2017 Certificate of Achievement 2016, PVRI Committee for Young Clinicians and Scientists

2017 Best Clinical Abstract Award, PVRI 2017

2017 Abstract Scholarship, American Thoracic Society 2017

## Service/Outreach

### *National/international outreach*

- 2003 - Tau Beta Pi
- 2006 - Alpha Omega Epsilon (Founding member of the Omicron chapter)
- 2008 - American Thoracic Society
- 2013 - Pulmonary Vascular Research Institute, Member of the committee for young clinicians and scientists
- 2014 - American Heart Association
- 2014 - International Society of Heart and Lung Transplant
- 2015 - Biomedical Engineering Society

## Publications

1. Tuchscherer HA, **Vanderpool RR**, Chesler NC. \* Pulmonary vascular remodeling in isolated mouse lungs: effects on pulsatile pressure-flow relationships. *J Biomech.* 2007;40(5):993-1001. PMID: 16756983
2. Chesler NC, Roldan A, **Vanderpool RR**, Naeije R. \* How to measure pulmonary vascular and right ventricular function. *Conf Proc IEEE Eng Med Biol Soc.* 2009;2009:177-80. PMID: 19964469
3. Chesler NC, Argiento P, **Vanderpool R**, D'Alto M, Naeije R. \* How to measure peripheral pulmonary vascular mechanics. *Conf Proc IEEE Eng Med Biol Soc.* 2009:173-6. PMID: 19963956
4. **Vanderpool RR**, Naeije R, Chesler NC. \* Impedance in isolated mouse lungs for the determination of site of action of vasoactive agents and disease. *Ann Biomed Eng.* 2010 May;38(5):1854-61. PMID: 20162354
5. **Vanderpool RR**, Kim AR, Molthen R, Chesler NC. \* Effects of acute Rho kinase inhibition on chronic hypoxia-induced changes in proximal and distal pulmonary arterial structure and function. *J Appl Physiol* (1985). 2011 Jan;110(1):188-98. PMID: 21088209
6. **Vanderpool RR**, Chesler NC. \*Characterization of the isolated, ventilated, and instrumented mouse lung perfused with pulsatile flow. *J Vis Exp.* 2011 Apr 29;(50). pii: 2690. PMID: 21559007
7. Groepenhoff H, Overbeek MJ, Mulè M, van der Plas M, Argiento P, Villafuerte FC, Beloka S, Faoro V, Macarlupu JL, Guenard H, de Bisschop C, Martinot JB, **Vanderpool R**, Penalosa D, Naeije R. Exercise pathophysiology in patients with chronic mountain sickness exercise in chronic mountain sickness. *Chest.* 2012 Oct;142(4):877-84. PMID: 22302297
8. Argiento P\*, **Vanderpool RR\***, Mulè M, Russo MG, D'Alto M, Bossone E, Chesler NC, Naeije R. Exercise stress echocardiography of the pulmonary circulation: limits of normal and sex differences. *Chest.* 2012 Nov;142(5):1158-65. \*contributed equally PMID: 22539647
9. Pavelescu A, **Vanderpool R**, Vachiéry JL, Grunig E, Naeije R. Echocardiography of pulmonary vascular function in asymptomatic carriers of BMPR2 mutations. *Eur Respir J.* 2012 Nov;40(5):1287-9. PMID: 23115311
10. **Vanderpool RR**, El-Bizri N, Rabinovitch M, Chesler NC. \* Patchy deletion of *Bmpr1a* potentiates proximal pulmonary artery remodeling in mice exposed to chronic hypoxia. *Biomech Model Mechanobiol.* 2013 Jan;12(1):33-42. PMID: 22314711

11. Naeije R, Vachiery JL, Yerly P, **Vanderpool R**. The transpulmonary pressure gradient for the diagnosis of pulmonary vascular disease. *Eur Respir J*. 2013 Jan;41(1):217-23. PMID: 22936712
12. Naeije R, **Vanderpool R**, Dhakal BP, Saggar R, Saggar R, Vachiery JL, Lewis GD. Exercise-induced pulmonary hypertension: physiological basis and methodological concerns. *Am J Respir Crit Care Med*. 2013 Mar 15;187(6):576-83. PMID: 23348976
13. Naeije R, **Vanderpool R**. Pulmonary hypertension and chronic mountain sickness. *High Alt Med Biol*. 2013 Jun;14(2):117-25. PMID: 23795731
14. Pagnamenta A\*, **Vanderpool R\***, Brimiouille S, Naeije R. Proximal pulmonary arterial obstruction decreases the time constant of the pulmonary circulation and increases right ventricular afterload. *J Appl Physiol* (1985). 2013 Jun;114(11):1586-92. \*contributed equally PMID: 23539317
15. D'Alto M, Romeo E, Argiento P, D'Andrea A, **Vanderpool R**, Correra A, Bossone E, Sarubbi B, Calabrò R, Russo MG, Naeije R. Accuracy and precision of echocardiography versus right heart catheterization for the assessment of pulmonary hypertension. *Int J Cardiol*. 2013 Oct 9;168(4):4058-62. PMID: 23890907
16. Novelli EM, Hildesheim M, Rosano C, **Vanderpool R**, Simon M, Kato GJ, Gladwin MT. Elevated pulse pressure is associated with hemolysis, proteinuria and chronic kidney disease in sickle cell disease. *PLoS One*. 2014 Dec 5;9(12):e114309. PMID: 25478953
17. Faoro V, Huez S, **Vanderpool R**, Groepenhoff H, de Bisschop C, Martinot JB, Lamotte M, Pavelescu A, Guénard H, Naeije R. Pulmonary circulation and gas exchange at exercise in Sherpas at high altitude. *J Appl Physiol*. 2014 Apr 1;116(7):919-26. PMID: 23869067
18. Pellegrini P, Rossi A, Pasotti M, Raineri C, Ciccoira M, Bonapace S, Dini FL, Temporelli PL, Vassanelli C, **Vanderpool R**, Naeije R, Ghio S. Prognostic relevance of pulmonary arterial compliance in patients with chronic heart failure. *Chest*. 2014 May;145(5):1064-70. PMID: 24356904
19. Lau EM, **Vanderpool RR**, Choudhary P, Simmons LR, Corte TJ, Argiento P, D'Alto M, Naeije R, Celermajer DS. Dobutamine stress echocardiography for the assessment of pressure-flow relationships of the pulmonary circulation. *Chest*. 2014 Oct;146(4):959-66. PMID: 24626933
20. **Vanderpool RR**, Pinsky MR, Naeije R, Deible C, Kosaraju V, Bunner C, Mathier MA, Lacomis J, Champion HC, Simon MA. RV-pulmonary arterial coupling predicts outcome in patients referred for pulmonary hypertension. *Heart*. 2015 Jan;101(1):37-43. PMID: 25214501
21. **Vanderpool R**, Gladwin MT. Harnessing the nitrate-nitrite-nitric oxide pathway for therapy of heart failure with preserved ejection fraction. *Circulation*. 2015 Jan 27;131(4):334-6. PMID: 25533965
22. Vriz O, Argiento P, D'Alto M, Ferrara F, **Vanderpool R**, Naeije R, Bossone E. Increased pulmonary vascular resistance in early stage systemic hypertension: a resting and exercise stress echocardiography study. *Can J Cardiol*. 2015 Apr;31(4):537-43. PMID: 25745880
23. Rischard F, **Vanderpool R**, Jenkins I, Dalabih M, Colombo J, Lax D, Seckeler M. Selective pulmonary vasodilation improves ventriculovascular coupling and gas exchange in a patient with unrepaired single-ventricle physiology. *Pulm Circ*. 2015 Jun;5(2):407-11. PMID: 26064468

24. **Vanderpool RR**, Naeije R. Progress in Pulmonary Hypertension with Left Heart Failure. Beyond New Definitions and Acronyms. *Am J Respir Crit Care Med*. 2015 Nov 15;192(10):1152-4. PMID: 26568239
25. Lai YC, Tabima DM, Dube JJ, Hughan KS, **Vanderpool RR**, Goncharov DA, St Croix CM, Garcia-Ocaña A, Goncharova EA, Tofovic SP, Mora AL, Gladwin MT. SIRT3-AMP-Activated Protein Kinase Activation by Nitrite and Metformin Improves Hyperglycemia and Normalizes Pulmonary Hypertension Associated With Heart Failure With Preserved Ejection Fraction. *Circulation*. 2016 Feb 23;133(8):717-31. PMID: 26813102
26. Bertero T, Oldham WM, Cottrill KA, Pisano S, **Vanderpool RR**, Yu Q, Zhao J, Tai Y, Tang Y, Zhang YY, Rehman S, Sugahara M, Qi Z, Gorcsan J 3rd, Vargas SO, Saggarr R, Saggarr R, Wallace WD, Ross DJ, Haley KJ, Waxman AB, Parikh VN, De Marco T, Hsue PY, Morris A, Simon MA, Norris KA, Gaggioli C, Loscalzo J, Fessel J, Chan SY, Vascular stiffness mechanoactivates YAP/TAZ-dependent glutaminolysis to drive pulmonary hypertension. *J Clin Invest*. 2016 Sep 1;126(9):3313-35. PMID: 27548520
27. Brewis MJ, Bellofiore A, **Vanderpool RR**, Chesler NC, Johnson MK, Naeije R, Peacock AJ, Imaging right ventricular function to predict outcome in pulmonary arterial hypertension. *Int J Cardiol*. 2016 Sep 1;218:206-11. PMID: 27236116
28. **Vanderpool RR**, Rischard F, Naeije R, Hunter K, Simon MA., Simple functional imaging of the right ventricle in pulmonary hypertension: Can right ventricular ejection fraction be improved? *Int J Cardiol*. 2016. PMID: 27532240
29. Simon MA, **Vanderpool RR**, Nouraiie, M, Bachman T, White P, Sugahara M, Gorcsan, Parsley EL, Gladwin, Acute hemodynamic effects of inhaled sodium nitrite in pulmonary hypertension associated with heart failure with preserved ejection fraction. *JCI Insight*. 2016.
30. Kudryashova TV, Goncharov DA, Pena A, Kelly N, **Vanderpool R**, Baust J, Kobir A, Shufesky W, Mora AL, Morelli AE, Zhao J, Ihida-Stansbury K, Chang B, DeLisser H, Tuder RM, Kawut SM, Silljé HH, Shapiro S, Zhao Y, Goncharova EA. HIPPO-Integrin-linked Kinase Cross-Talk Controls Self-Sustaining Proliferation and Survival in Pulmonary Hypertension. *Am J Respir Crit Care Med*. 2016 Oct 1;194(7):866-877. PMID: 27119551
31. Kelly NJ, Radder JE, Baust JJ, Burton CL, Lai YC, Potoka KC, Agostini BA, Wood JP, Bachman TN, **Vanderpool RR**, Dandachi N, Leme AS, Gregory AD, Morris A, Mora AL, Gladwin MT, Shapiro SD. Mouse Genome-Wide Association Study of Preclinical Group II Pulmonary Hypertension Identifies Epidermal Growth Factor Receptor. *Am J Respir Cell Mol Biol*. 2017 Apr; 56(4):488-496. PMID: 28085498
32. Meng Q, Lai YC, Kelly NJ, Bueno M, Baust JJ, Bachman TN, Goncharov D, **Vanderpool RR**, Radder JE, Hu J, Goncharova E, Morris AM, Mora AL, Shapiro SD, Gladwin MT. Development of a Mouse Model of Metabolic Syndrome, Pulmonary Hypertension, and Heart Failure with Preserved Ejection Fraction. *Am J Respir Cell Mol Biol*. 2017 Apr; 56(4):497-505. PMID: 28118022
33. **Vanderpool RR**, Desai AA, Knapp SM, Simon MA, Abidov A, Yuan JX, Garcia JGN, Hansen LM, Knoper SR, Naeije R, Rischard FP. How prostacyclin therapy improves right ventricular function in pulmonary arterial hypertension. *Eur Respir J*. 2017 Aug 24; 50(2) pii: 1700764. PMID: 28838981
34. Tang H, Vanderpool RR, Wang J, Yuan JX. Targeting L-arginine-nitric oxide-cGMP pathway in pulmonary arterial hypertension. *Pulm Circ*. 2017 July-Sep; 7(3):569-571 PMID: 28895506

35. Jang S, **Vanderpool RR**, Avazmohammadi R, Lapshin E, Bachman TN, Sacks M, Simon MA. Biomechanical and Hemodynamic Measures of Right Ventricular Diastolic Function: Translating Tissue Biomechanics to Clinical Relevance. *JAHA*. 2017 Sep 12; 6(9):e006084. PMID: 28899895

### Work in Progress

1. **Vanderpool RR**, Morris A, Risbano MG, Bachman TN, Sciruba F, Champion HC, and Simon MA. Clinical Evaluation of the RV-PA interaction using pulmonary vascular impedance and pressure-volume loops.
2. **Vanderpool RR**, Saul M, Nourai M, Gladwin MT, Simon MA. Population based characterization of the definition, prevalence and associated morbidity and mortality of pulmonary hypertension in the setting of left heart disease.

### Media

1. Prof. Irene Lang FPVRI, interviewed by Rebecca Vanderpool, FPVRI, January 27, 2014. <https://pvri.info/en/professionals/learning/2014/1/27/prof-irene-lang-fpvri-interviewed-by-rebecca-vanderpool-fpvri/>
2. Clinical evaluation of the RV-PA interaction using pulmonary vascular impedance and pressure-volume loops, January 27, 2014. <https://pvri.info/en/professionals/learning/2014/1/27/clinical-evaluation-of-the-rv-pa-interaction-using-pulmonary-vascular-impedance-and-pressure-volume-loops/>
3. Role of PA stiffness & RV/PA coupling in pulmonary hypertension, January 27, 2014. <https://pvri.info/en/professionals/learning/2014/1/27/role-of-pa-stiffness-rvpa-coupling-in-pulmonary-hypertension/>

### Conference/Scholarly Presentations

#### *Symposia/Conferences*

1. **Vanderpool RR**. Non-invasive evaluation of the pulmonary circulation. Seventh John Vane Symposium on Prostacyclin Science and Pulmonary Vascular Disease, London, England, March 23-24, 2012.
2. **Vanderpool RR**. Role of PA stiffness and RV/PA coupling in Pulmonary Hypertension. Joint Symposium ECCPS/PVRI 2014: Molecular Mechanisms and Treatment of Heart and Lung Disease, Germany, January, 27-31, 2014.
3. **Vanderpool RR**. Diastolic Right Ventricular Function in Severe Pulmonary Arterial Hypertension. China Heart Congress (CHC 2017), Beijing, China, August, 10-13, 2017.

#### *Abstracts*

1. **Vanderpool RR**, Tuchscherer H and Chesler NC. Role Of Nitric Oxide In Pulmonary Vascular Remodeling Biomedical Engineering Society Conference, Baltimore, MD, Sept. 28 – Oct. 1, 2005.
2. **Vanderpool, R.R.** and Chesler, N.C. The role of eNOS defects in pulmonary vascular reactivity. Biomedical Engineering Society Conference, Chicago, IL, October 11-14, 2006.
3. **Vanderpool RR**, and Chesler NC. The effect of vasoactive agents on impedance measures in the pulmonary circulation of the mouse. Proceedings of the ASME Summer Bioengineering Conference, June 20-24, Keystone, Colorado, 2007

4. **Vanderpool RR**, and Chesler NC. Hypoxia-induced pulmonary hypertension causes changes in proximal and distal pulmonary arteries not eliminated by acute Rho-kinase inhibition. American Thoracic Society International Conference. Toronto Canada, May 16-19, 2008
5. Kim, AR, **Vanderpool RR**, and Chesler NC. Quantification of arterial rarefaction in isolated mouse lungs. Biomedical Engineering Society Annual Meeting. St. Louis MO, October 1-3, 2008
6. **Vanderpool RR**, and Chesler NC. Contribution of persistent vasoconstriction to chronic hypoxia-induced PAH in mouse lungs. Biomedical Engineering Society Annual Meeting. St. Louis MO, October 1-3, 2008
7. Tabima D.M\*, **Vanderpool R\***, and Chesler N. Characteristic impedance in isolated mouse lungs is inversely proportional to proximal artery stiffness. Artery 8. Ghent, Belgium. September 2008 \*Authors contributed equally.
8. Chesler NC, Argiento P, **Vanderpool R**, D'Alto M, and Naeije R. How to measure peripheral pulmonary vascular mechanics. Conf Proc IEEE Eng Med Biol Soc. 173-6. 2009
9. Chesler NC, Roldan A, **Vanderpool RR**, and Naeije R. How to measure pulmonary vascular and right ventricular function. Conf Proc IEEE Eng Med Biol Soc. 177-80. Review. 2009
10. Moses, L Roldan-Alzata R, **Vanderpool R**, Molthen R, and Chesler NC. The role of collagen in hypertension-induced stiffening of pulmonary arteries. Biomedical Engineering Society Annual Meeting. Pittsburgh PA, October 9-10, 2009.
11. **Vanderpool RR**, and Chesler NC. Effect of acute rho kinase inhibition on pulmonary vascular distensibility in isolated mouse lungs following chronic hypoxia. Pittsburgh International Lung Conference. Pittsburgh University. October 9-10, 2009.
12. Roldan-Alzata R, **Vanderpool RR**, and Chesler NC. The effects of pulmonary vascular collagen accumulation on right ventricular afterload investigated using a genetically engineered mouse model. American Thoracic Society International Conference. New Orleans. May 14-19, 2010.
13. Tabima DM, **Vanderpool RR**, and Chesler NC. Comparing pulmonary input and characteristic impedance determined in the time and frequency domains: The effects of chronic hypoxia. American Thoracic Society International Conference. New Orleans, LA. May 14-19, 2010.
14. **Vanderpool RR**, and Chesler NC. Fixed vs. reactive changes in the pulmonary vasculature with chronic hypoxia: Use of a hemodynamic model to interpret pressure-flow data. American Thoracic Society International Conference. New Orleans, LA. May 14-19, 2010.
15. **Vanderpool RR**, El-Bizri N, Rabinovitch M and Chesler NC. Patchy deletion of Bmpr1a potentiates proximal pulmonary artery remodeling in mice exposed to chronic hypoxia. Denver, CO. May 13-18, 2011.
16. Argiento P\*, **Vanderpool RR\***, Mule M, Russo MG, D'Alto M, Bossone E, Chesler NC, Naeije, R. Gender differences in the normal human pulmonary circulation. American Thoracic Society International Conference. San Francisco, CA. May 18-23, 2012.
17. **Vanderpool RR**, Argiento P, Mule M, Naeije, R. Prediction of mean pulmonary artery pressures at exercise from baseline measurements. American Thoracic Society International Conference. San Francisco. May 18-23, 2012
18. **Vanderpool RR**, Champion HC, Simon MA. Estimates of end-systolic pressure in clinical pressure-volume loops to assess right ventricular function. Joint Symposium ECCPS/PVRI

2014: Molecular Mechanisms and Treatment of Heart and Lung Disease, Germany, January, 27-31, 2014.

19. **Vanderpool RR**, Morris AM, Risbano M, Sciruba F, Gladwin MT, Champion HC and Simon MA. Clinical evaluation of the RV-PA interaction using pulmonary vascular impedance and pressure-volume loops. Joint Symposium ECCPS/PVRI 2014: Molecular Mechanisms and Treatment of Heart and Lung Disease, Germany, January, 27-31, 2014. \*Won a poster award
20. **Vanderpool RR**, Simon MA, Champion HC. Right ventricular function assessed by pressure-volume loops and associated assumptions. American Thoracic Society International Conference, 2014.
21. **Vanderpool RR**, Shterental S, Bachman TN, Lapshin E, Longhini A, Gladwin MT, Simon MA. Metabolic syndrome and pulmonary hypertension due to left heart disease. American Heart Association Scientific Sessions 2014. - Poster
22. **Vanderpool RR**, Gladwin MT, Simon MA. Estimating the Prevalence of Pulmonary Hypertension Due to Left Heart Disease in Patients Undergoing a Right Heart Catheterization. American College of Cardiology 2015 - Poster
23. **Vanderpool RR**, Gladwin MT, Simon MA. Hemodynamic markers of pulmonary vascular disease in pulmonary hypertension due to left heart disease. International Society of Heart and Lung Transplantation 2015 – Podium Presentation
24. **Vanderpool RR**, Saul MI, Nouraie M, Gladwin MT, Simon MA. Population Based Characterization of the Definition, Prevalence and Associated Mortality of Pulmonary Hypertension in the Setting of Left Heart Disease. American Heart Association – Scientific Sessions 2016.
25. **Vanderpool RR**, Knapp SM, Honkanen I, Wickstrom K, Desai AA, Bernardo R, Rischard F. Right Ventricular Diastolic Function Assessed By Pressure-Volume Loops And Associated Assumptions. 11<sup>th</sup> PVRI Annual World Congress on PVD 2017 – Podium Presentation
26. **Vanderpool R.R**, Knapp SM, Honkanen I, Wickstrom K, Desai AA, Bernardo R, Rischard F. Resting pulmonary vascular and right ventricular stiffness is associated with right ventricular contractile reserve in pulmonary arterial hypertension. American Thoracic Society International Conference 2017. – Podium Presentation

**Awarded Grants and Contracts:**

None