

Andrew Resnick

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<http://resnicklab.wordpress.com/>

Date: June 12, 2019

Education:

- July 1997: Ph.D. in Physics University of Alabama in Huntsville, Huntsville, AL
- Dissertation Title: Statics and Dynamics of Vibrating Liquid Bridges, (J. Iwan D. Alexander, advisor)
- June 1991: B.S. in Physics, Rensselaer Polytechnic Institute, Troy, NY

Honors and Awards:

- 2017 Faculty Merit Recognition Award
2016 Faculty Merit Recognition Award
2015 Faculty Merit Recognition Award
2014 Faculty Merit Recognition Award
2011-2014 NIH R15 Research Award
2003-2008 NIH K25 Mentored Quantitative Research Award
2005 Research ShowCASE outstanding Postdoctoral Poster award
2000 Member, Outstanding Technical Team for Mine Detection Data Collection
1993-1997 NASA Graduate Student Research Program Grant

Professional Experience:

- 2019-Present Interim Associate Dean for Curriculum and Operations, College of Science and Health Professions, Cleveland State University
- 2014-Present Associate Professor, Department of Physics, Cleveland State University
- 2009-2014 Assistant Professor, Department of Physics, Cleveland State University
- 2009-Present Assistant Professor (secondary appointment), Department of Biology, Geology and Environmental Sciences, Cleveland State University
- 2013-Present Assistant Professor (secondary appointment), Department of Chemical and Biomedical Engineering, Cleveland State University
- 2009-Present Adjunct Staff, Department of Cell Biology, Cleveland Clinic Foundation
- 2009-Present Adjunct Assistant Professor, Department of Physiology and Biophysics, Case Western Reserve University
- 2010-Present Member, Center for Gene Regulation in Health and Disease
- 2014-Present Member, UAB Hepatorenal Fibrocystic Disease Core Center (HRFDCC)
- 2014-Present Member, VA Advanced Platform Technology Center
- 2016-Present Founding Member, STEMM Education Center
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- 2005-2009 Instructor, Department of Physiology and Biophysics, Case Western Reserve University
- 2004-2005 Post-doctoral Fellow, Department of Physiology and Biophysics, Case Western Reserve University

- The role of sensory cilia in cellular mechanosensation. Systems under investigation include renal and airway epithelial tissue. Primary experimental probes are laser tweezers, microscopy, and two-sided perfusion chambers.

2003-2004 Research Staff, National Center for Microgravity Research at NASA Glenn Research Center

1999- 2003 Senior Scientist, Northrop Grumman at NASA Glenn Research Center

- Participant in NASA projects including Ultraviolet-Visible-Infrared Spectrometer (UVIS), Vapor Phase Catalytic Ammonia Removal (VPCAR), Soft condensed matter program group, Bioscience New Directions.
- Senior member of the Light Microscopy Module (LMM) development team, responsible for the development of a fully automated microscope.
- Development of novel instrumentation (laser tweezers), spaceflight modifications to new microscopy technologies (confocal microscopy, spectrophotometer), and static and dynamic light scattering.
- Direct experience with a wide range of equipment including solid-state lasers, fiber optic systems, optical test and measurement equipment, acousto-optic and electro-optic modulators, digital cameras and interfaces, image processing and optical system design.
- Participated in several KC-135 reduced gravity flights, experienced over 400 zero-g parabolas.

1997 - 1999 Research Scientist, Nichols Research Corporation

- Responsible for the development of an accurate physical model for passive and active sensor simulations. Added polarization effects, millimeter wave imaging, rough surface scattering and improved thermal flow models.
- Developed and used a dual rotating retarder Mueller matrix spectropolarimeter with the goal of obtaining highly accurate and precise surface scattering measurements.

1992- 1997 Experimental investigation into dynamic behavior of contact line and contact angle of liquid bridges (Ph.D. dissertation).

- Fundamental research of a basic physical phenomena (liquid bridges) common to many technological processes, e.g. floating-zone crystal growth, fluid flow in porous materials, and adhesion
- Constructed a neutral buoyancy (Plateau) tank, computer controlled motion equipment, Schlieren, Fourier, and imaging optical systems
- Developed innovative and accurate measurements of contact angle and interfacial energy in reduced gravity conditions

Teaching Experience:

2009-Present Assistant Professor, Department of Physics, Cleveland State University

- PHY 221 (College Physics I), Fall 2009-2014
- PHY 222 (College Physics II), Spring 2010-2013

- PHY 241 (University Physics I), Fall 2015, Fall 2017, Spring 2018, Fall 2018
- PHY 242 (University Physics II), Spring 2016, Fall 2017, Fall 2018
- PHY 440 (Quantum Physics I), Spring 2015, Spring 2017
- PHY 441 (Quantum Physics II), Fall 2015, Fall 2017
- PHY 455/555 (Advanced Optics Lab), Spring 2012
- PHY 460/560 (Lasers and Photonics), Fall 2012; Fall 2016
- PHY 480/580 (Optical Materials), Spring 2014
- PHY 493 Advanced Topics (OpSTEM Research Methods), Spring 2015

2003-2009 Instructor, Department of Physiology and Biophysics, Case Western Reserve University

- Anat/Phol 517, “Optical Imaging and Microscopy for Biologists” May 19-23, 2003 (Anna-Liisa Nieminen, course director)
- Anat/Phol 517, “Optical Imaging and Microscopy for Biologists” May 23-28, 2004 (Anna-Liisa Nieminen, course director)
- PHOL 476, “Cellular Biophysics”, Spring 2005 (Ulrich Hopfer, course director)
- PHOL 476, “Cellular Biophysics”, Spring 2006 (Ulrich Hopfer, course director)
- PHOL 476, “Cellular Biophysics”, Spring 2007 (Ulrich Hopfer, course director)
- MBIO 525, “Advances in Biological Imaging”, Fall 2006 (David McDonald, course director)
- GENE 537, “Light and Video Microscopy”, Fall 2007 (Patty Conrad, course director)
- Block 2 small group “Cell signaling” 8/25/08 (George Dubyak, course coordinator)
- Block 2 small group “Cell signaling” 8/27/07 (George Dubyak, course coordinator)
- Trained over 20 microscopy users as manager of the Cystic Fibrosis Center Core Imaging Laboratory

2000-2001 Lecturer, Department of Physics, Case Western Reserve University.

- PHYS 115, “Physics I”, Summer 2000
- PHYS 115, “Physics I” and PHYS 121 “Mechanics”, Fall 2000

1997-1999 Research Scientist, Nichols Research Corporation

- “Infrared phenomenology” (in-house training)
- “Polarization and Polarimetry” (in-house training)

Research Support: PENDING

Grant Number: NIH R15

Project Title: “Bending Primary Cilia: evidence for a structure-function relationship?”

Project Dates: April 1, 2019- March 31, 2022

Award amount (\$445,499)

Grant Number: NSF MRI

MRI: Acquisition of a fast 3D VIS-IR Microscopy Imaging System for Dynamic Physical and Biological Soft Systems

Project Date: 9/1/2017

Award Amount: 594,954

Co-PIs: Christopher L Wirth, Geyou Ao, Aaron Severson

Research Support: AWARDED

Grant Number: CSU USRA 2018

Project Title: Construction and evaluation of a CosmicWatch muon detector

Project dates: June 1, 2018-August 31, 2018

Award amount: \$5000

Grant Number: NIH 2R01HL070985-13A1

Project Title: Salt-Sensitive Hypertension: Role of Renal superoxide [Co-I, Garvin PI (CWRU)]

Project dates: July 1, 2016- June 30, 2021

Award amount: \$83,758

Research Support: COMPLETED

Grant Number: NSF 1161152

Project Title: Mathematics Achievement as a STEP for STEM Success

Project Dates: August 1, 2013- July 30, 2017

Award amount: \$875,900

Principal Investigator: John Holcomb

Co-PI(s): Andrew Resnick, Debbie Jackson, Stephen Duffy

Grant Number: Dr. John Vitullo's pilot and bridge funding program (GRHD)

Project Title: Primary cilia signaling: fluid flow may regulate tissue health and ADPKD progression

Project Dates: April 7, 2016 – April 6, 2017

Award Amount: \$6,000

Grant Number: Cleveland State University Faculty Development Program

Project Title: Mechanobiology: the primary cilium and fluid flow

Project dates: June 1, 2015- May 30, 2016

Award amount: \$20,738

Grant Number: Cleveland State University Faculty Innovation Fund Program

Project Title: Microperfusion Tissue Interrogator: platform technology development

Project dates: April 1, 2014- March 31, 2015

Award amount: \$40,000

Grant Number: NSF 1337859

Project Title: MRI: Acquisition of an integrated atomic force microscope/ Inverted optical microscope for interdisciplinary research at Cleveland State University

Project Dates: 08/13/13

Award Amount: \$289,939

Principal Investigator: Chandrasekhar Kothapalli

Co-PI(s): Andrew Resnick, Xue-Long Sun, Nolan Holland, Orhan Talu

Grant Number: Cleveland State University GRHD Faculty Development Program

Project Title: Microfluidic Fabrication Facility

Project dates: June 1, 2013- July 31, 2014

Award amount: \$8000

Grant Number: 1 R15 DK092716-01
Project Title: Fluid flow is an environmental modifier of ADPKD
Project dates: May 1, 2011- April 30, 2014
Award amount: \$332,343

Grant Number: Cleveland State University Faculty Development Program
Project Title: The Primary Cilium Mediates Cellular Mechanosensation
Project dates: July 1, 2011- June 30, 2012
Award amount: \$19,797

Grant Number: 1 K25 DK071027-01 (NIH/NIDDK)
Project Title: Flow Effects on Primary Cilium Deflection
Project dates: July 1, 2005- June 30, 2010

Grant Number: Cystic Fibrosis Foundation R447-CR02
Project Title: Role of Primary Cilium in Airway Surface Liquid Regulation
Project dates: July 1, 2006-June 30, 2008

NIH NCRR Shared Instrumentation Grant Program
Project Title: Upright Light Microscope Workstation
Project dates: 4/1/2006-3/31/2007

Peer-reviewed Papers:

- [1] Alexander, J. I. D., Delafontaine, S., Resnick A. and Carter, W. C. (1996) Stability of Non-axisymmetric Liquid Bridges. *Microgravity Sci. Technol.* IX/3, 193-200.
- [2] Slobozhanin L., Alexander J.I.D., and Resnick A. (1997) Bifurcation of the equilibrium states of a weightless liquid bridge. *Phys. Fluids* 9 (7), 1893-1905.
- [3] Resnick A. and Alexander J.I.D. (1997) A Plateau tank apparatus for liquid bridge research. *Review of Scientific Instruments* 68 (3), 1495-1500.
- [4] Resnick A and Alexander J.I.D., (1997) A Coherent Fourier Optical Imaging System for Liquid Bridge Research. *Proc. SPIE Aerosense 1997 meeting*, Vol 3073.
- [5] Watson J., Wellfare M., Foster J., Owens M., Vechinski D., Richards M., and Resnick A. (1998) Irma Multisensor Predictive Signature Model. *Proc. SPIE Vol. 3375*, p. 78-92, *Targets and Backgrounds: Characterization and Representation IV*, Wendell R. Watkins; Dieter Clement; Eds. doi:10.1117/12.327143
- [6] Resnick A, Persons C., and Lindquist G. (1999) Polarized Emissivity and Kirchhoff's Law. *Applied Optics* 38, 1384-1387.
- [7] Resnick A. (2001) Design and Construction of a space-borne optical tweezer apparatus. *Review of Scientific Instruments* 72, 4059-4065.
- [8] Resnick A. (2002) Differential interference contrast microscopy as a polarimetric instrument. *Applied Optics* 41, 38-45.
- [9] Resnick A (2003) Use of laser tweezers for colloid science. *J. Colloid and Interface Science* 262, 55-59.
- [10] Resnick A, Hopfer U. (2007) Force-response considerations in ciliary mechanosensation. *Biophys J.* 93 (4), 1380-90.
- [11] Resnick A, Hopfer U. (2008) Mechanical stimulation of primary cilia. *Frontiers in Bioscience* Jan 1;13:1665-80.

- [12] Yu Cheng, Anna C. Samia, Jun Li, Ping Zhang, Malcolm E. Kenney, Andy Resnick, Clemens Burda (2010) Quantification the Release of a Gold Nanoparticle-Caged PDT Drug Pc 4 into Human Cancer Cells. *Langmuir* 26(4):2248-55 (feature article).
- [13] Resnick A. (2010) Use of optical tweezers to probe epithelial mechanosensation. *J. Biomedical Optics* 15 (1), 015005 1-8.
- [14] Resnick A. (2011) Chronic Fluid Flow is an Environmental Modifier of Renal Epithelial Function. *PLoS ONE* 6(10): e27058. doi:10.1371/journal.pone.0027058.
- [15] Boslett, B., Nag, S. and Resnick, A. (2014) Detection and Antibiotic Treatment of Mycoplasma arginini Contamination in a Mouse Epithelial cell line Restores Normal Cell Physiology. *BioMed Research International* 2014, Article ID 532105.
- [16] Glaser, J., Hoerich, D. and Resnick A. (2014) Near real-time measurement of forces applied by an optical trap to a rigid cylindrical object. *Opt. Eng.*, 53(7), 074110 doi:10.1117/1.OE.53.7.074110.
- [17] Lofgren, I and Resnick, A. (2015) A Simplified Model for the Optical Force exerted on a Vertically Oriented Cilium by an Optical Trap and the Resulting Deformation. *Photonics* 2, 604-618; doi:10.3390/photonics2020604 (**invited paper**)
- [18] Resnick A. (2015) Mechanical Properties of a Primary Cilium As Measured by Resonant Oscillation. *Biophys. J.* 109, 1-8; <http://dx.doi.org/10.1016/j.bpj.2015.05.031>
- [19] Resnick, A “HIF stabilization weakens primary cilia” *PLoS ONE*, Nov. 3, 2016, <http://dx.doi.org/10.1371/journal.pone.0165907>
- [20] Nag, S. and Resnick, A. “Biophysics and Biofluidynamics of Primary Cilia” (INVITED REVIEW); *American Journal of Physiology - Renal Physiology* Jun 2017, *ajprenal.00172.2017*; DOI: 10.1152/ajprenal.00172.2017
- [21] Susan Carver, Jenna Van Sickle, John P. Holcomb, Candice Quinn, Debbie K Jackson, Andrew H Resnick, Stephen F Duffy, Nigamanth Sridhar, Antoinette M Marquard. “Operation STEM: increasing success and improving retention among first-generation and underrepresented minority students in STEM”, *J. STEM Edu.* 18 (3) 2017
- [22] Nag, S. and Resnick, A. (2017) “Stabilization of Hypoxia Inducible Factor by Cobalt Chloride Can Alter Renal Epithelial Transport” *Physiol Rep*, 5 (24), 2017, e13531, <https://doi.org/10.14814/phy2.13531>
- [23] Candice M. Quinn, Derek K. Smith, Michaele F. Chappell, Susan D. Carver, Stephen Duffy, John P. Holcomb, Jr., Debbie Jackson, Andrew Resnick. “Music as Math Waves: Exploring Trigonometry through Sound”, *Journal of Mathematics and the Arts (JMA)*, Article ID: JMA 1552822 (to appear, 2018)

In Process:

- [24] Justin Flaherty, Zhe Feng, Zhangli Peng, Yuan-Nan Young, and Andrew Resnick, “Primary cilia have a length-dependent persistence length” (submitted to *Biomechanics and Modeling in Mechanobiology*, 2018)
- [25] Niksa Praljak and Andrew Resnick, “Pulsatile Flow through Idealized Renal Tubules: Fluid-Structure Interaction and Dynamic Pathologies” (submitted to *Applied Mathematical Modeling*)

Student Advisees:

Primary Thesis/Dissertation advisor:

Tara Diba (MS, Biomedical Engineering, 2016) Statics and Dynamics of Primary Cilia

Subhra Nag (Ph.D., Regulatory Biology, 2018) “Stabilization of Hypoxia Inducible Factor by Cobalt Chloride can Alter Renal Transepithelial Transport”

Albert Sundberg (M.S., Mathematics) “Model of Ciliary Motion in Physiological Conditions” (Thesis, 2015)

Andreea Sandu (BS, Biology, Spring 2012) Amplification and transfection of Plasmid EGFP-TBA2 for Live Cell Imaging of Primary Cilium. **Andreea was chosen as Spring 2012 COSHP College Valedictorian**

Committee Member:

Jonathan Damsel (Ph.D, Bioanalytic Chemistry, 2012) “Development of a Virtually Imaged Phased Array (VIPA) Line-scan Imaging Spectrograph for Mapping Strain in Polymer Implants”

Chesinta Voma (Ph.D, Bioanalytical and Clinical Chemistry, 2014), “Magnesium as a Regulator of Reticular NADPH in the Hepatocyte: A novel role of Magnesium in Diabetes and Obesity Onset”

Ibrahim Seven (Ph.D, Applied Biomedical Engineering, 2014), “Characterization of Corneal Biomechanical Properties with OCT Elastography”

Robert Cannon (M.S., Chemistry, 2013) “Automated Spectral Identification of Materials with Spectral Identity Mapping”

Tim Palinski (M.S., Chemistry, 2014) “Fourier Transform Infrared Spectroscopy with Application to the Venusian Atmosphere”

Terri Harford (Ph. D., Regulatory Biology, December 2009) “Apoptotic Threshold Regulation by the Muscle Regulatory Transcription Factor MYOD”

Joshua Whited (Ph. D, Chemistry) “Design and Synthesis of Boronic Acid-containing Macromolecules as Neo-Lectins (Lectin Mimetics)”

Nethrie Idippily (Ph. D, Chemistry) “Investigation of the Metabolism of a Small Molecule EphA2 Receptor Tyrosine Kinase Agonist”

Tiyash Bose (Ph.D., Microbiology, 2018) “Ruthenium Oxide based combined electrodes as Nitric Oxide (N) Sensors: Towards Measuring NO in Cystic Fibrosis Cell Line Models”

Kylin Emhoff (Ph.D., Chemistry) “Coordination Chemistry and Redox Activity of Heteroleptic Azodioxide Complexes” (passes candidacy exam, 2018)

Related Service:

- **Departmental committees or assignments**
- Medical Physics Curriculum Committee
- Medical Physics Steering committee
- Chair, TT Physics search committee (2015)
- Chair, Medical Physics search committee (2016)
- Chair, Lecturer (Physics) search committee (2017)

- **College committees or assignments**
- Academic Standards Committee, 2010-current (Chair 2014-current)
- COSHP Dean Search committee
- COSHP Peer Review committee, 2016-current (Chair 2017-current)
- Member, Health Science TT search committee (2015)
- Member, OpStem administrator search committee (2015)

- **University committees or assignments**
- Faculty Affairs Committee, 2017- current

- Faculty Senate, 2010- current (Vice President, 2015- 2017)
- Budget and Planning Advisory Committee, 2010-2013
- Academic Misconduct Committee, 2011-2014, 2018-current
- Student Grievance Board, 2018-current
- COSHP Representative, Graduate Council
- Ad Hoc Committee on Duplicative Programs
- Ad Hoc Committee on Public-Private Partnership for Parking Assets

- **Regional, State, and National service**
- 2016 Reviewer, EDISON School Governor Awards (Ohio academy of Science)