Keith E. Cook, PhD

Contact Information

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Education

BSE, Mechanical Engineering	University of Michigan	9/88-5/93
BSE, Engineering Science	University of Michigan	9/88-5/93
MS, Biomedical Engineering	Northwestern University	9/93-12/96
PhD, Biomedical Engineering	Northwestern University	12/96-12/00

Academic Appointments

Professor — 7/17-present
Carnegie Mellon University
Department of Biomedical Engineering

Associate Professor — 9/13-7/17
Carnegie Mellon University
Department of Biomedical Engineering

Associate Research Professor — 9/11 - 9/13
University of Michigan
Departments of Surgery and Biomedical Engineering

Assistant Research Professor — 9/07 – 9/11
University of Michigan
Departments of Surgery and Biomedical Engineering

Research Investigator — 9/03 – 8/07
University of Michigan
Departments of Surgery and Biomedical Engineering

Senior Research Associate — 9/02 – 9/03
University of Michigan Department of Surgery
Ann Arbor, Michigan

Research Assistant Professor — 6/01 – 9/02
Northwestern University
Department of Surgery

Other Scientific Employment

Director, Cardiovascular Research Laboratory — 9/98 – 9/02
Children's Memorial Hospital
Division of Cardiovascular and Thoracic Surgery

Summer Intern — 5-8/91-93
Research and Design
Sarns/3M Healthcare

Research Interests

Advanced Respiratory Support	Design and development of artificial and tissue-based lungs, liquid ventilation hardware and techniques, and animal models of lung disease
Blood-Biomaterial Interactions	Development of biomaterials offering endothelial-like properties to increase the longevity of blood processing artificial organs
Pulmonary Drug Delivery	Development of perfluorocarbon emulsions for intra-pulmonary drug delivery to treat lung disease

Right Ventricular Function Mathematical modeling of right ventricular function to better understand dysfunction under stressed states, such as high afterload and hypoxia

Current Research Grants and Contracts

Cystic Fibrosis Foundation (**Cook, PI**) 9/1/17-8/31/19
Antibacterial Perfluorocarbon Ventilation
$108,000 (Total costs for total project)
The purpose of this grant is to examine the use of antibacterial perfluorocarbon ventilation (APV) as a means of enhancing the treatment of chronic and recurrent respiratory infections similar to those experienced by patients with cystic fibrosis.

US Army CDMRP (**Cook, PI**) 9/1/2017-8/31/2019
A Highly Portable and Biocompatible Pulmonary Assist System for Long-Term Respiratory Support
$1,475,844 (Total costs for total project)
The goal of this grant is to develop a highly biocompatible pulmonary assist system for long-term respiratory support of veterans with chronic hypoxia.

NIH/NHLBI R43HL134450 (**Cook and Skoog, PIs**)
Pulmonary Assist Device for Destination Therapy
$217,540.84 (Total costs for total project)
The purpose of this proposal is to develop a highly biocompatible pulmonary assist device (PAD) to support patients with chronic lung disease for months to years.

NIH/NHLBI R01HL089456 (Antaki, PI; **Cook, Co-I**) 4/1/17-3/31/21
Multiscale Modeling of Thrombosis in Artificial Circulation
$3,474,928 (Total costs for total project)
The purpose of this project is to create a computer simulation program that will predict coagulation within medical devices, and thereby guide developers of these devices to produce more safe and effective devices.

National Institutes of Health, 2R01HL089043 (**Cook, PI**) 8/17/14 – 3/31/18
Compliant Thoracic Artificial Lungs
The goals of this project are to improve the blood biocompatibility of compliant thoracic artificial lungs to expand their use from weeks to several months.
$2,381,014 (Total costs for total project)

National Institutes of Health, 2R01HL089043 (**Cook, PI**) 8/17/14 – 3/31/18
Supplement to Compliant Thoracic Artificial Lungs
This supplement supports one graduate student who will examine the antibacterial properties of nitric oxide releasing surfaces in artificial lungs.
$182,000 (Total costs for total project)

American Heart Association (**Cook, PI**) 2/1/17-1/31/20
Carnegie Heart Summer Undergraduate Fellowship Program
$60,000 (Total costs for total project)
The purpose of this grant is to provide a summer training program for undergraduate biomedical engineers interested in applying their knowledge to cardiovascular research.

Pending Research Grants and Contracts

NIH/NHLBI R01 (Bacchetta, PI; **Cook, Co-I**) 9/1/17-8/31/21
The Road to Destination Therapy: Optimizing Long-Term Mechanical Cardiopulmonary Support for Pulmonary Hypertension
$2,628,216 (Total costs for total project)
The goal of this proposal is to develop long-term cardiopulmonary support for patients with chronic, severe pulmonary arterial hypertension and right ventricular failure using a highly durable, biocompatible pulmonary assist device (PAD) as bridge to recovery, bridge to transplantation or as destination therapy.

NIH/NHLBI R01 (Bacchetta, PI; Cook, Co-I) 9/1/17-8/31/21
Long-Term Artificial Lung Anticoagulation without Bleeding Using a Selective Factor XIIa Inhibitor

$2,517,626 (Total costs for total project)
This proposal examines the use of an innovative, highly selective bicyclic peptide Factor XIIa inhibitor to inhibit blood clotting within artificial lungs. The goal is to provide potent, long-term artificial lung anticoagulation without causing bleeding in patients' tissues.

Completed Research Grants and Contracts

Disruptive Health Technologies Institute (**Cook, PI**) 9/1/16-8/31/17
Antibacterial Perfluorocarbon Ventilation To Increase Ventilator Free Days and Reduce Hospitalization Following Lower Respiratory Infection
The goal of this project is to determine if aerosolized aqueous antibiotic in perfluorocarbon emulsions can be used to increase ventilator free days and reduce hospitalization following lower respiratory infection.
$295,216 (Total costs for total project)

VA Rehabilitation R&D Merit Review Grant I01RX000390 (Potkay, PI; **Cook, Co-I**)
Toward portable microchannel artificial lungs for veteran rehabilitation
$824,485 (Total costs for total project)
The long-term goal of this technology development project is develop artificial lung using microchannel technologies for treatment of acute and chronic lung diseases.

National Institutes of Health, R01HL116434 (Miller, PI; **Cook, Co-I**) 8/1/13-7/31/17
Ultrasound-Induced Pulmonary Hemorrhage During Diagnostic Examination of the Lung
The goal of this project is to investigate the causes of pulmonary hemorrhage during diagnostic ultrasound.
$1,933,534 (Total costs for total project)

American Heart Association (**Cook, PI**) 2/1/15-1/31/17
GRA Winter 2014 Predoctoral Fellowship
$40,000 (Total costs for total project)
The purpose of this grant is to provide a summer training program for undergraduate biomedical engineers interested in applying their knowledge to cardiovascular research.

American Heart Association 14PRE20380061 (Demarest, PI; **Cook, Sponsor**)
Development of an Artificial Lung for Destination Therapy
$52,000 (Total costs for total project)
The purpose of this grant is to provide support work on a destination therapy artificial lung performed by Caitlin Demarest, a graduate student in Dr. Cook's laboratory.

National Institutes of Health, 1R43HL121946 (Montoya, PI; **Cook, PI, CMU subcontract**) 8/15/14 – 8/15/15
Nitric Oxide Generating Hollow Fibers For Artificial Lungs
The goal of this project is to develop nitric oxide releasing silicone hollow fibers and test their gas exchange and biocompatibility.
$58,016 (CMU total costs for total project)

National Institutes of Health R03AI096029 (**Cook, PI**) 5/1/12-4/30/14
Antibacterial Perfluorocarbon Ventilation to Treat Severe Respiratory Infections
The overall objective of this research is to determine if total antibacterial perfluorocarbon ventilation can improve treatment of bacterial respiratory infections.
$155,500 (Total costs for total project)

National Institutes of Health 1R43HL082083 (Montoya, PI; **Cook, PI on UM subcontract**) 4/1/11-3/31/14
Long-term extracorporeal blood oxygenating device (Phase III)
The goal of this project is to develop silicone hollow fiber oxygenators and test their hemodynamics, gas exchange, and biocompatibility.
$526,564 (UM total costs for total project)

National Institutes of Health, R01 HL089043 (**Cook, PI**) 1/1/09-11/30/13
Compliant Thoracic Artificial Lungs
The goals of this project are to develop a compliant thoracic artificial lung as a bridge to lung transplantation.
$1,447,940 (Total costs for total project)

Terumo Cardiovascular (**Cook, PI**) 7/18/08-8/31/13
Terumo Cardiovascular Sponsored Research
This goals of this project are to evaluate cardiopulmonary bypass equipment for Terumo.
$15,000 (total costs for total project: this is a fee for service protocol and is ongoing)

Terumo Cardiovascular (**Cook, PI**) 7/18/08-8/31/13
Terumo Cardiovascular Systems In Vivo Minimally Invasive Surgery
This project compares the function of prototype vein harvesting equipment.
$93,000 (total costs for total project: this is a fee for service protocol and is ongoing)

National Institutes of Health, R01 HL069420 (Bartlett, PI; **Cook, Co-I**) 8/20/07-6/30/13
Development of a Total Artificial Lung
The objective of the project is to optimize the design and application of a thoracic artificial lung to prepare it for clinical trials.
$4,791,574 (Total costs for total project)

National Institutes of Health, R01 HD015434 (Campos, PI; **Cook, Co-I**) 8/1/10-7/31/13
Surface Enhanced Biocompatible Blood Oxygenators
The goals of this project are to evaluate novel oxygenator gas transfer membranes with increased biocompatibility.
$30,775 (UM total costs for total project)

National Institutes of Health 1R44HL110521 (Bocks, PI, **Cook, Co-I**) 9/1/11-6/30/13
Novel micro-implant to measure intracardiac pressure in congenital heart patients
The goal of this project is to create a pressure sensor to monitor cardiac function in patients with staged correction of congenital heart disease.
$172,436 (UM Total costs for total project)

Michigan Innovation Center, Concept to Commercialization Grant (Chronis, PI, **Cook, Co-I**) 6/1/12-5/31/13
In Vivo Testing Of Powerless, Intracranial Pressure (ICP) Microsensors
The goal of this project is to perform long-term, in vivo testing of fully implantable, powerless ICP microsensors.
$40,000 (Total costs for total project)

Coulter Foundation (**Cook, PI**) 6/1/11-12/31/12
A Compact Cardiopulmonary Support Device
The goals of this project are to develop a compact, biocompatible device for cardiopulmonary support.
$100,000 (UM total costs for total project)

National Institutes of Health, R01 HD015434 (Bartlett, PI; **Cook, Co-I**) 7/1/07-6/30/12
Extracorporeal Circulation Without Anticoagulation
The goals of this project are to evaluate non-thrombogenic surface coatings.
$3,743,946 (Total costs for total project)

National Institutes of Health, R01 HL089043 (**Cook, PI**) 7/01/09-6/31/11
ARRA Administrative Supplement to Compliant Thoracic Artificial Lungs
This project examines the relationship between the relative effects of pulmonary hypertension and hypoxia on right ventricular failure.
$126,826 (Total costs for total project)

National Institutes of Health, R01 HL089043 (**Cook, PI**) 7/01/09-6/31/11
ARRA Summer Student Supplement to Compliant Thoracic Artificial Lungs
This funds summer students to work on the parent grant.
$21,717 (Total costs for total project)

National Institutes of Health, 2 R44 HL082083 (Montoya, PI; **Cook, PI on UM subcontract**) 8/1/06-4/30/10
Long-term extracorporeal blood oxygenating device (Phase II)
The goal of this project is to develop silicone hollow fiber oxygenators and test their hemodynamics, gas exchange,

and biocompatibility in vivo.
$248,567 (UM total costs for total project)

National Institutes of Health, R41 HL092636 (**Cook, PI**) 8/1/08-7/31/10
Compact Cardiopulmonary Support Device
The goals of this project are to develop a compact, biocompatible device for cardiopulmonary support.
$162,223 (Total costs for total project)

National Institutes of Health; 2R44 DK 074289-03 (Buffington, PI; **Cook, Co-I**) 9/1/08-8/31/10
Cell Therapy for Septic Shock, Phase II
This project develops a bioartificial device for the treatment of the systemic inflammatory response syndrome.
$145,262 (UM total costs for total project)

US Department of Defense (Humes, PI; **Cook, Co-I**) 1/1/09-8/31/10
Development and Assessment of a BPICS In a Chronic Diabetic Sheep Model
This project develops a bioartificial pancreas.
$177,774 (UM total costs for total project)

US Department of Defense (Humes, PI; **Cook, Co-I**) 1/1/09-8/31/10
Assessment of a BRECS In a Chronic Sheep Model
This project develops a bioartificial renal cell system for the treatment of chronic renal failure.
$104,652 (Total costs for total project)

University of Michigan Cardiovascular Center McKay Award (Kripfgans, PI; **Cook, consultant**) 6/1/09-5/31/10
Preliminary Investigations of 3D Ultrasound Volume Flow in Cardiac Output
$23,156 (UM total costs for total project)

US Department of Defense (Humes, PI; **Cook, Co-I**) 3/1/09-2/28/10
Assessment of Sorbent Dialysis System In Uremic Pig Model
This project will test the performance of a device that integrates a device that sequesters and inhibits leukocytes with a portable sorbent dialysis system in a large animal model of uremia.
$56,455 (UM total costs for total project)

National Institutes of Health, 1R43DK080529-01 (Buffington, PI; **Cook, Co-I**) 3/1/08-2/28/10
Selective Cytopheresis Therapy in Systemic Inflammatory Response Syndrome
This project develops a device that sequesters and inhibits leukocytes for the treatment of the systemic inflammatory response syndrome.
$110,007 (UM total costs for total project)

Department of Defense (Humes, PI; **Cook, Co-I**) 1/1/07 – 12/31/09
Development of Bioartificial Wearable Kidney
This project develops a wearable bioartificial kidney (WEBAK) for the treatment of chronic renal failure.
$118,826 (UM total costs for total project)

University of Michigan Department of Surgery Research Advisory Council (**Cook, PI**) 6/1/07-5/31/09
Biomimetic Microchannel Networks for Artificial Organs
This project prototypes and tests the gas transfer function of three-dimensional microchannel networks.
$25,000 (Direct costs for total project)

National Institutes of Health (Humes, PI; **Cook, Co-I**) 1/7/07-1/8/09
Cell Therapy for Septic Shock, Phase I
This project develops a bioartificial renal cell system for the treatment of septic shock.
$30,200 (UM total costs for total project)

Terumo Cardiovascular 1/7/07-1/8/09
Terumo Cardiovascular Systems Minimally Invasive Surgery
This project tests the function of prototype vein harvesting equipment
$88,412 (Total costs for total project)

Coulter Foundation (Mychaliska, PI; **Cook, Co-I**) 1/1/06-12/31/07
Development of an Artificial Placenta: Effect of Pumpless Arteriovenous Extracorporeal Membrane Oxygenation on Fetal Circulation
The goal of this project was to develop a pumpless artificial placenta to provide respiratory support for premature children.
$200,000 (Total costs for total project)

National Institutes of Health; 2 R44 HL053168 (Chambers, PI; **Cook, PI on UM subcontract**) 1/07/05-12/31/08
Totally Implantable Artificial Lung: Studies for FDA
This project performed preclinical testing of the MC3 Biolung thoracic artificial lungs.
$467,532 (UM total costs for total project)

National Institutes of Health; R01 HL069420 (Bartlett, PI; **Cook, Co-I**) 2/1/02-12/31/07
Development of a Total Artificial Lung
The objective of the project is to use engineering methods to optimize thoracic artificial lung gas exchange and hemodynamics and test these devices in vivo for periods up to 30 days.
$5,386,977 (UM total costs for total project)

American Heart Association; 0235439Z (**Cook, PI**) 9/16/03-6/30/06
Preoperative Right Ventricular and Pulmonary Hemodynamic Assessment to Predict Ideal Artificial Lung Attachment Mode
The objective was to develop a means to predict the ideal thoracic artificial lung attachment mode based on pre-operative assessment of right ventricular function and pulmonary hemodynamics
$247,500 (Total costs for total project)

National Institutes of Health 1-R43-HL082083 (Montoya, PI; **Cook, Co-I**) 8/1/05-2/28/06
Long-term extracorporeal blood oxygenating device (Phase I)
The goal of this project is to develop silicone hollow fiber oxygenators and test their hemodynamics, gas exchange, and biocompatibility in vivo
$24,869 (UM total costs for total project)

Novalung, GbH (**Cook, PI**) 1/1/04-12/31/04
Evaluation of a Novel Diffusion Membrane Oxygenator For Long-Term Veno-Venous Extracorporeal Life Support
The goal of this project was to perform preclinical studies on the Novalung ILA gas exchanger for the FDA.
$165,000 (Total costs for total project)

Northwestern University Institute for Bioengineering and Nanoscience in Advanced Medicine (Kung, PI; **Cook, Co-I**) 9/1/02-8/31/03
Microtube Assemblies for Artificial Lungs
The goal of this project was to develop a microtube gas exchange membrane for artificial lungs.
$35,000 (Total costs for total project)

Honors and Awards

University of Michigan Research Faculty Recognition Award	2011
Michigan Society for Medical Research Bennett J. Cohen Education Leadership Award	2011
Top Abstract, American Society of Artificial Internal Organs	2009
Top Abstract, Respiratory Section, American Society of Artificial Internal Organs	2008
American Society of Artificial Organs Medforte Innovation Fellowship	2007
Top Abstract, Respiratory Section, American Society of Artificial Internal Organs	2007
American Society of Artificial Internal Organs Young Investigator Award	2003
Northwestern University Cabell Dissertation Year Fellowship	1999
American Society of Artificial Internal Organs/Whitaker Foundation Travel Fellowship	1998
American Society of Artificial Internal Organs/Whitaker Foundation	1997

Travel Fellowship
American Society of Artificial Internal Organs Fellowship 1996
The Whitaker Foundation Graduate Fellowship in Biomedical Engineering 1994
Northwestern University Cabell Fellowship 1993

Membership in Professional Societies

American Society of Artificial Internal Organs 2000-present
Biomedical Engineering Society 2010-present
Society of Critical Care Medicine 2009-2013
American Society of Extracorporeal Technology 2011-2012

Editorial Positions, Boards, and Peer Review

Coagulation and Blood Research (CBR) Peer Review Panel 10/15-12/15
2015 Combat Casualty Care Research Program (CCCRP)
Department of Defense U.S. Army Medical Research and Materiel Command

Editorial Board 2007-present
American Society of Artificial Internal Organs (ASAIO) Journal

Bioengineering, Technology, and Surgical Sciences Study Section 8/13-12/13
Center for Scientific Review (CSR), National Institute of Health

NIH Early Career Reviewer Program 2012-2013
Center for Scientific Review (CSR), National Institute of Health

Editor, Respiratory Support Section 2007-2016
American Society of Artificial Internal Organs (ASAIO) Journal

Editor-In-Chief, 2006-2007
American Society of Artificial Internal Organs Website

Editor, Respiratory Support Section 2005-2009
American Society of Artificial Internal Organs Website

Journal Review

Reviewer, American Society of Artificial Internal Organs Journal 2004-present
Reviewer, Annals of Thoracic Surgery 2006-2014
Reviewer, Pediatric Research 2009-2010
Reviewer, Biotechnology and Bioengineering 2009-2010
Reviewer, Annals of Biomedical Engineering 2011-present
Reviewer, Critical Care Medicine 2011-2014
Reviewer, Journal of Biomechanics 2012-present
Reviewer, Circulation 2012-2014
Reviewer, Journal of Surgical Research 2013-2014
Reviewer, Acta Biomaterialia 2015-present
Reviewer, Frontiers of Chemical Science and Engineering 2015-present

Teaching Experience

Courses

BME 648/ME 612, Cardiovascular Mechanics Spring, 2014-present
BME 341/ME 334, Introduction to Biomechanics Fall, 2014-present
BME 642/ME 619 Biological Fluid Mechanics Fall, 2014

Responsible Conduct of Research and Scholarship, Workshop B 2012-2013
(Data Management, Avoiding Research Misconduct)
Surgery 499, Surgical Research 2002-2013
Biomedical Engineering 419/519, Quantitative Physiology 2003-2009
(Vascular Physiology Section)

Guest Lectures

BME 42-444 Medical Devices 10/7/13
"Artificial Lungs, History and State of the Art"

BME 42-201 Professional Issues in Biomedical Engineering 10/30/13
"Research and Career"

	BME 42-101 Introduction to Biomedical Engineering "How Not to Design an Artificial Lung"	3/17/13
	BME 42-201 Professional Issues in Biomedical Engineering "Research and Career"	4/3/14
	BME 42-444 Medical Devices "Artificial Lungs, History and State of the Art"	4/21/14
	BME 42-201 Professional Issues in Biomedical Engineering "Use of Animals in Research"	Once per semester since 9/14
	BME 42-201 Professional Issues in Biomedical Engineering "Career Options for PhDs"	Once per semester from fall 2014-spring 2016
	BME 42-101 Introduction to Biomedical Engineering "Artificial Lungs"	3/2/15
	BME 42-101 Introduction to Biomedical Engineering "Artificial Lungs (and How I Learned to Love Them)"	10/19/15
	BME 42-444 Medical Devices "Artificial Lungs, History and State of the Art"	4/4/16
	BME 42-101 Introduction to Biomedical Engineering "Artificial Lungs: Background, Biomechanics, and Biomaterials"	11/28/16
Guest Mentor *University of Pittsburgh Medical School*	*"*ECMO for Primary Graft Dysfunction"	9/29/15
	"Effect of ultra-fast mild hypothermia using total liquid ventilation on hemodynamics and respiratory mechanics"	10/18/16
Carnegie Mellon University Seminars	"The Big Fish: Destination Therapy with Artificial Lungs" CMU Medical Management Masters Degree Seminar	10/2/15

University of Michigan Seminars

BME 500 Seminar, *"Optimizing Artificial Lung Attachment Using Modeling and Diagnostics,"* October, 2002.

Surgery Monthly Research Conference, *"Compliant Artificial Lungs"* November, 2003.

Medical School Technology Group, *"Artificial Lungs, State of the Art"*, January, 2004.

Biomedical Engineering 295 Seminar, *"How Not to Design an Artificial Lung",* February, 2004.

Thoracic surgery seminar, *"Artificial Lung Research Update,"* January, 2005.

Thoracic surgery seminar, *"30-Day Artificial Lung Testing in a Pulmonary Artery to Left Atrium Configuration"* April, 2007.

Michigan Research Community, *"Research Ethics"* September, 2007-2009

University Research Opportunities Program, *"Thoracic Artificial Lungs"* February, 2008

Summer Research Opportunities Progam, *"Biomedical Engineering and Research Careers: How They Won't Ruin Your Life (Maybe)"* June, 2008

University Research Opportunities Program, *"Advanced Respiratory Support"* December, 2009

Laboratory Research Mentoring

Post-Doctoral Fellows	John Mcgillicuddy, MD	2001-2003
	Hitoshi Sato, MD; Felicia Ivascu, MD	2003-2004
	Hitoshi Sato, MD; Joanna Brown, MD; Alvaro Rojas, MD	2004-2005
	Hitoshi Sato, MD; Joanna Brown, MD; Alvaro Rojas, MD	2005-2006
	June Reoma, MD; Alvaro Rojas, MD	2006-2007
	June Reoma, MD; Anne Kim, MD; Alvaro Rojas, MD	2007-2008
	Begum Akay, MD; Daniele Camboni, MD; Anne Kim, MD	2008-2009
	Peter Sassalos, MD; Martin (Menglin) Lee, MD	2009-2011
	Chris Scipione, MD	2010-2012
	Kagya Amoako, PhD	2012-2014
	David Skoog, PhD	2016-present
	Noritsugu Naito, MD	2017-present
	Saif Al-Qatarni, MD	2017-present
PhD student advisees	Rebecca Schewe	2006-2012
	Kagya Amoako	2007-2011
	Ryan Orizondo	2010-2015
	David Skoog	2011-2015
	Caitlin Demarest	2014-2017
	Diane Nelson	2013-present
	Angela Lai	2014-present
	Rei Ukita	2014-present
	Erica Comber	2017-present
Dissertation Committees	Jennifer Zierenberg, Yu Chun	2005-2007
	Paola Bagnoli (University of Milan)	2006
	Ying Zhen	2005-2008
	Jenn Hayden	2013-2016
	Andrea Martin	2015-2017
Master degree projects:	Amy Cosnowski - Pulmonic Valve Function During Artificial Lung Use	2003
	Robert Smith - Pumping Artificial Lung	2004
	Adam Finley - Compliant Thoracic Artificial Lung	2004
	Jeongho Kim - Pulmonary Impedance and Right Ventricular Function	2005
	Alex Kuo - Pulmonic Valve Function During Artificial Lung Use	2005
	Darren Galligan - Lumped Parameter Modeling of Right Ventricular Function During Artificial Lung Attachment	2006
	Matthew Nelson - Evaluation of gas exchangers for liquid ventilation	2007
	Mina Lotfi - In-parallel attachment of a low-resistance compliant thoracic artificial lung under rest and simulated exercise	2008
	David Skoog - Compact Cardiopulmonary Support Device	2010-2011
	Surbhi Gupta - Effect of Combined Antiadsorptive Coatings and Nitric Oxide on Platelet Adhesion	2010-2011
	Amanda Vo - Right ventricular function modeling under high afterload and Hypoxia	2011
	Jordan Reilly - 14-day Compliant Artificial Lung Testing	2012-2013
	Tsung-Hsuen Wu - Fiber Bundle Design and Coagulation	2013-2014
	John Miller – Surface Focused Anticoagulation in Mini-Lungs	2013-2014
	Tanuf Tembulkar – Right Ventricular Metabolic Modelling Using PET	2013-2014
	Alida Cooke – FXII Inhibitors for Artificial Lungs	2015-2017

	Sam David Christdoss Pushpam – Antibacterial Perfluorocarbon Ventilation	2015-2016
	Pooja Pawar – Thrombomodulin Coatings for Artificial Lungs	2015-2016
	Niyu Li – Optimizing Compliant Artificial Lung Aspect Ration Using CFD	2015-2017

Undergraduate laboratory research mentorship, Carnegie Mellon University

	Summer Undergraduate Research Fellowship (SURF)	
	William Croughan, Marissa Morales	2014
	Megan Pudlo, Benjamin Yang	2015
	James Kromka, Divya Bramharouthu, Gayatri Paranjape	2016
	Andre Gutierrez Marty, Erin Kavanaugh, Samantha Shoemaker, Benjamin Yang, Kimberly Klausing, Aakash Parekh	
	Carnegie Heart Summer Fellowship	
	Rachel Freer	2015
	Research For Credit	
	Joet Bagga, Sophie Lohmann (with RWTH Aachen)	Spring, 2015
	Yifan Wang, Ansley Sharna, Megan Pudlo	Fall, 2015
	Kennix Lee, Anna Bandecca, Benjamin Yang	Spring, 2016
	Neil Carleton, Yifan (Jack) Wang, Kate Beittenmiller, Julia Napolitano, Austin Berg, Divya Bramharouthu Ansley Sharna	
	Anna Bandecca, Divya Bramharouthu, Gayatri Paranjape	Fall, 2016
	Jack Wang, Jim Kromka. Neha Kapate, Neil Carleton	
	Alexis Kim, Anna Bandecca, Brent Ifemembi, Hyeon Ju Song	Spring, 2017
	Jack Wang, Jim Kromka. Leslie Chen, Neha Kapate, Neil Carleton Gayatri Paranjape	
Med. student research year	David Somand	
Medical school summer biomedical research program	Grace Ahn	2003
	Srinu Kusuma, Suresh Allah	2004
	Alex Kuo, Justin Munns	2006
	Ted John, Ben Mervak	2008
	Eric Krause, John Albert, Joe Church, Justin Chamberlain, Alex Martusiewicz	2009
	Jennifer Singleton	2010

Undergraduate laboratory research mentor, University of Michigan

	NIH Minority Supplement	
	Melanie Odeleye	2004-2006
	Sarah Marian Parker Scholars	
	Six students	2004
	Jane Xiao	2008
	Anam Rashid	2009
	Maria Mercado, Allison McNamara	2010
	Emily Desanti	2012
	Undergraduate Research Opportunities Program	
	10 students	2004-2005
	17 students	2005-2006
	14 students	2006-2007
	19 students	2007-2008
	12 students	2008-2009

	14 students	2009-2010
	15 students	2010-2011
	13 students	2011-2012
	16 students	2012-2013
	Molecular, Cellular, and Developmental Biology 300 and/or 400	
	Jocelin Chang	2008-2009
	Arathi Mohan, Michael Grady, Bradley Faliks, Monica Martusiewicz, Erika Boothman	2009-2010
	Ashima Goyal, Amanda Vo	2010-2011
	Claire Sorek, Alexander Redmond	2012-2013
	Chemistry 398	
	Katie Manno	2008
	Summer Research Opportunities Program	
	Carl Mcgill, Edna Gonzalez	2005
	Camiellia Jones	2008
	Anthony Aliatim	2010
	MedSOAR	
	Amanda Lee	2010
	Samantha Habhab	2011
	Brandon Sowell	2012
	Michigan Space Grant Consortium	
	Maurice Telesford	2004

Committee, Organizational, and Volunteer Service

Member, Institutional Animal Care and Use Committee Allegheny Health Network	2/16-
Director, Carnegie Mellon University Bioengineered Organ Initiative	9/16-present
Director, American Heart Association Carnegie Heart Summer Fellowship Program	5/15-present
Eberly Center's Teaching Summit planning committee	1/16-9/16
Member, Institutional Animal Care and Use Committee Carnegie Mellon University	11/15-12/16
Chair, University Committee on the Use and Care of Animals (UCUCA), University of Michigan	2012-2013
Member, UCUCA Advisory Council (UAC) Office of the Vice President of Research, University of Michigan	2012-2013
Member, Large Animal Working Group Office of the Vice President of Research, University of Michigan	2012-2013
Sub-committee Member on Institutional Animal Training University of Michigan	2012-2013
Committee Member, Task Force to Divest UCUCA from the Unit Of Laboratory Animal Medicine (ULAM) Office of the Vice President of Research, University of Michigan	2010-2011
Committee Member, University Committee on the Use and Care of Animals (UCUCA) University of Michigan	2007-2011

Reviewer, University of Michigan Cardiovascular Center Summer Undergraduate Fellowships — 2011-2013

Member, University of Michigan Cardiovascular Center — 2009-2013

Committee Member, Task Force on Team Science — 2006
University of Michigan Medical School

Conference Planning Committee — 2007-2010
American Society of Artificial Internal Organs

Conference Abstract Reviewer — 2007-2010, 2014
American Society of Artificial Internal Organs

Consulting Positions

Terumo Cardiovascular — 2008-2013
Subjects covered: *Endoscopic Vein Harvesting Study Design*
Assessment of Oxygenator Biocompatibility
Experimental Evaluation of Blood Gas Sensors
Blood-Biomaterial Interactions

Alung Technologies — 2014-2015
Subjects covered: *Artificial Lung Test Methods, with particular focus on biocompatibility.*

HeartWare — 2015-2016
Subjects covered: *Mathematical modeling of oxygenation*

Extramural Invited Presentations

“Hematological Artificial Lung Design” — 10/12/00
Biomedical Engineering Society Annual Conference
Seattle, Washington

"Artificial Lung Research at the University of Michigan" — 6/20/03
American Society of Artificial Internal Organs Annual Conference
Washington, DC

“Predicting Ideal, Artificial Lung Attachment Mode With Pre-Attachment Indices” — 6/28/03
American Society of Mechanical Engineering Bioengineering Conference
Key Biscayne, Florida

“The Latest in Lung Assist” — 10/9/04
Heart Failure and Rotary Blood Pump Summit
Cleveland Clinic
Cleveland, Ohio

“Right Ventricular Function During Thoracic Artificial Lung Attachment” — 9/29/05
Biomedical Engineering Society Annual Conference
Baltimore, MD

“Compliant Artificial Lungs” — 7/3/06
2006 World Congress of Biomechanics
Aachen, Germany

“Artificial Lungs as Bridge to Lung Transplantation” — 4/20/11
Michigan Society for Medical Research Annual Conference
Lansing, MI

"Blood-Biomaterial Interactions in Cardiopulmonary Bypass Circuits" 5/19/11
Terumo Cardiovascular National Sales Meeting
Miami, FL

"Bench to Bedside: Engineering Challenges Facing Artificial Lung Translation" 6/11/11
American Society of Artificial Internal Organs Annual Conference
Washington, DC

"Compliant Thoracic Artificial Lungs" 6/13/13
American Society of Artificial Internal Organs Annual Conference
Chicago, IL

"Compliant Thoracic Artificial Lungs" 7/11/13
Columbia University Pulmonary, Allergy and Critical Care Medicine Seminar
New York, NY

"Fluid Mechanical Design of Thoracic Artificial Lungs" 7/11/14
World Congress of Biomechanics, Boston, MA

"Artificial Lung: The Holy Grail" 1/8/15
New Frontiers In Pulmonary Hypertension And ECMO
New York, NY

"The Future is Now: Destination Therapy with Artificial Lungs" 6/25/15
American Society of Artificial Internal Organs Annual Conference
Chicago, IL

"Shiny New Lungs: Engineering to Repair or Replace Damaged Lungs" 2/29/16
University of Washington Chemical Engineering Seminar
Seattle, WA

"Shiny New Lungs: Engineering to Repair or Replace Damaged Lungs" 5/19/16
Northwestern University Research Day Keynote
Chicago, IL

"Shiny New Lungs: Engineering to Repair or Replace Damaged Lungs" 11/15/16
University of Pittsburgh Division of Pulmonary, Allergy, and Critical Care Medicine
Pittsburgh, PA

"Shiny New Lungs: Engineering to Repair or Replace Damaged Lungs" 2/21/17
University of Pittsburgh Cystic Fibrosis Research Center
Pittsburgh, PA

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Inventions

University of Michigan Office of Technology Transfer

1. UM OTT 3377 Artificial Lung, Invention Report received 2/24/06
2. UM OTT 5003 A Compact Cardiopulmonary Support Device, Invention Report received 4/22/11
3. UM OTT 5457 High Void Fraction Fiber Bundle for Artificial Lungs, Invention Report received 7/17/12
4. CMU Invention Disclosure 2014-171: “Compact Pulmonary Assist Device for Destination Therapy” Status: patent pending (PCT/US2015/024799)
5. CMU Invention Disclosure 2015-440: “Water in Perfluorocarbon Emulsions For Intrapulmonary Drug Delivery” Status: provisional patent filed 5/28/2015.

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