

## *Curriculum Vitae*

# PAUL ANTHONY IAIZZO

### PERSONAL INFORMATION

Home:	3974 Birch Knoll Drive White Bear Lake, MN 55110	Phone: (651) 340-9551 Cell: (612) 867-1222
Business:	Department of Surgery University of Minnesota 420 Delaware St. SE B172 Mayo, MMC 195 Minneapolis, MN 55455	Phone: (612) 624-7912 Fax: (612) 624-2002 Email: iaizz001@umn.edu
Birthplace/Date:	Superior, Wisconsin, USA; November 26, 1956	
Citizenship:	USA	
Marital Status:	Married to Margaret K. Iaizzo, PT (8/13/83)	
Children:	Maria (7/13/84), Jenna (6/4/86), Hanna (12/3/90)	
Grandchildren:	Giada, Fiona, Cosetta, Reven, Luchia	

### EDUCATION

1978	BS, Biology, University of Minnesota, Duluth
1980	MS, Physiology, University of Minnesota, Duluth Advisor: Robert S. Pozos, MS Thesis: "The effect of fatigue on physiological action tremor of the ankle"
1986	PhD, Physiology (Neurophysiology), University of Minnesota Advisors: Richard E. Poppele, PhD, Stuart R. Taylor, PhD Thesis: "Aequorin luminescence from stimulated skeletal muscle cells: relation between changes in intracellular calcium and contractile force"

### POSTDOCTORAL POSITIONS

1986	Postdoctoral NIH research fellowship, Department of Pharmacology, Mayo Foundation Advisor: Robert G. Tancredi, MD (Rochester, MN)
1987-88	Postdoctoral Alexander von Humboldt-Stiftung research fellowship, Department of Neurology, Technical University of Munich Hosts: Albrecht Struppler, MD and Frank Lehmann-Horn, MD (Munich, Germany)

**ACADEMIC POSITIONS**

1979-81	Sea Grant Pre-doctoral Trainee (Advisor: Robert S. Pozos, PhD)
1981-83	Research and Teaching Assistant, Department of Physiology, Laboratory of Neurophysiology, University of Minnesota (Chairman: Eugene Grim, PhD)
1986	NIH Research Fellow, Department of Pharmacology, Mayo Foundation, Rochester, MN (Director: Robert G. Tancredi, MD)
1987-88	Alexander von Humboldt-Stiftung Research Fellow, Department of Neurology, Technical University of Munich, Germany (Hosts: Albert Struppler, MD and Frank Lehmann-Horn, MD)
1988-90	Assistant Professor of Anesthesiology, Research Associate, Mayo Medical School, Rochester, MN (Chairmen: Alan Sessler, MD, Roy Cucchiara, MD, and D Rorie, MD, PhD)
1990-91	Research Associate, Department of Anesthesiology, University of Minnesota (Chairman: Richard J. Palahniuk, MD)
1990-92	Visiting Scientist, Department of Anesthesiology, Mayo Clinic, Rochester, MN (Hosts: Jack D. Michenfelder, MD and William L. Lanier, MD)
1990-01	Director of Anesthesia Research, Department of Anesthesiology, University of Minnesota
1991-96	Assistant Professor, Department of Anesthesiology, University of Minnesota (Chairman: Richard J. Palahniuk, MD)
1992-96	Assistant Professor, Department of Physiology, University of Minnesota (Chairman: Robert F. Miller, MD)
1992-99	Associate in the Center for Interfacial Engineering, University of Minnesota (Director: DF Evans, PhD; center closed in 1999)
1993-00	Guest Professor, Abteilung Angewandte Physiologie, Universität Ulm, Ulm, Germany; 1-2 visits annually (Professor and Head: Frank Lehmann-Horn, MD)
1996-01	Guest Professor, Biomedical Engineering, Fachhochschule Anhalt, Köthen, Germany; 4-5 lectures annually (Host: Professor Markus J. Seewald, PhD)
1996-01	Associate Professor, Departments of Anesthesiology and Physiology, University of Minnesota (Chairmen: Richard J. Palahniuk, MD and Joseph Di Salvo, PhD)
1996-03	Co-Director, Center for Muscle and Muscle Disorders, University of Minnesota (Co-Director: John W. Day, MD, PhD)
1999-01	Associate Professor, Carlson School of Management, University of Minnesota (Associate Dean: C.J. Nachtsheim, PhD)
1990-Present	Director of the Malignant Hyperthermia Muscle Biopsy Center, Department of Surgery, University of Minnesota
1993-Present	Graduate Faculty, Biomedical Engineering, University of Minnesota (Director: Victor Barocas, PhD)
1993-Present	Graduate Faculty, Physiology, University of Minnesota (Directors: John Osborn, PhD, Stephen Katz, PhD, Catherine Kotz, PhD)
1996-Present	Faculty, Carlson Entrepreneurship Program, Carlson School of Management, University of Minnesota (Director: Harry Sapienza, PhD)
1998-Present	Graduate Faculty, Neuroscience, University of Minnesota (Director: Virginia S. Seybold, PhD)
2001-Present	Professor, Carlson School of Management, University of Minnesota (Associate Dean: C.J. Nachtsheim, PhD)

2001-2003	Professor, Department of Anesthesiology, University of Minnesota (Chairman: Richard C. Prielipp, MD)
2001-Present	Professor, Department of Integrative Biology and Physiology, University of Minnesota (Chairman: Joseph Metzger, PhD)
2002-Present	Professor, Department of Surgery, University of Minnesota (Chairmen: Selwyn M. Vickers, MD, David Rothenberger, MD, Sayeed Ikramuddin, MD, MHA)
2002-2015	Professor, Experimental Surgical Services, Department of Surgery, University of Minnesota (Director: Richard W. Bianco)
2002-Present	Director of Education, Lillehei Heart Institute, University of Minnesota (Directors: Daniel J. Garry, MD, PhD, Samuel Dudley, MD, PhD)
2003-Present	Affiliate Member, Graduate Faculty in Biological Science, University of Minnesota (Director: James A. Fuchs, PhD)
2004-Present	Medtronic Professorship in Visible Heart Research, Department of Surgery, University of Minnesota
2005-Present	Affiliate Senior Member, Graduate Faculty in Mechanical Engineering, Institute of Technology, University of Minnesota
2007-2013	Associate Director for Education, Institute for Engineering in Medicine, University of Minnesota (Director: Jeffery McCullough, MD)
2013-Present	Associate Program Director for Education and Outreach, Institute for Engineering in Medicine, University of Minnesota (Director: Bin He, PhD, John Bischof, PhD)
2015-Present	Graduate Faculty, Bioinformatics and Computational Biology, University of Minnesota

### HONORS AND AWARDS

1979-81	Sea Grant Pre-doctoral Traineeship
1986	National Institutes of Health Research Fellowship
1987-88	Alexander von Humboldt-Stiftung Research Fellowship
1988-92	Alexander von Humboldt-Stiftung Collaborative Research Travel Awards (7 trips to Germany)
1992	Organization for Economic Cooperation and Development; Research project on biological resource management; Paris, France (three-week fellowship in Germany)
1995	John Tate Award for Excellence in Academic Advising, University of Minnesota
1999,00,01	Finalist for the Horace T. Morse-Minnesota Alumni Association Award for Outstanding Contributions to Undergraduate Education, University of Minnesota
2002	University Recipient of the Award for Outstanding Contributions to Postbaccalaureate, Graduate, and Professional Education, University of Minnesota
2002	Academy of Distinguished Teachers, University of Minnesota
2002	Academy of Medical Educators, University of Minnesota
2004	Medtronic Professorship in Visible Heart Research
2007	Recognition of 5 years of service to the University for organizing President's 21 <sup>st</sup> Century Conferences on the Design of Medical Devices
2012	American Institute for Medical and Biological Engineering (AIMBE), College of Fellows 2012
2013	Academy of Medical Device Innovators, Institute for Engineering in Medicine
2013	Director's Award, Institute for Engineering in Medicine
2015	Fellow of Heart Rhythm Society
2015	Wangensteen Surgical Society

2016 IEEE Senior Member

### PROFESSIONAL MEMBERSHIPS

1979-81 American College of Sports Medicine  
 1985-Present Biophysical Society—USA  
 1986-Present European Malignant Hyperpyrexia Group (EMHG)  
 1989-Present American Society of Anesthesiologists (ASA)  
 1989-Present Minnesota Society of Anesthesiologists (MSA)  
 1990-Present North American Malignant Hyperthermia Registry (NAMHR)  
 1996-Present Biomedical Engineering Society (BMES)  
 2000-Present NASPE—Heart Rhythm Society (HRS)  
 2002-Present American Physiological Society (APS)  
 2002-Present American Heart Association (AHA)  
 2003-Present Heart Failure Society (HFS)  
 2006-Present American Society of Mechanical Engineers (ASME)  
 2008-Present Institute for Electrical and Electronics Engineers (IEEE)  
 2008-Present IEEE, Engineering in Medicine and Biology Society (EMBS)  
 2011-Present International Society for Cardiovascular Translational Research (ISCTR)  
 2014-Present American Institute for Medical and Biological Engineering (AIMBE)

### PROFESSIONAL ACTIVITIES

1991-04 Consultant, Augustine Medical Inc.  
 1992 Organizing Committee, VI International Malignant Hyperthermia Workshop  
 1992-Present Ad Hoc Grant Reviewer, Schweizerischer Nationalfonds zur Förderung der Wissenschaftlichen Forschung  
 1993-Present Professional Advisory Council of the Malignant Hyperthermia Association of the United States  
 1993-Present Ad Hoc Grant Reviewer, Naval Medical Research and Development Command  
 1994-96 Executive Committee, VIII International Malignant Hyperthermia Workshop  
 1994-96 Scientific Committee, VIII International Malignant Hyperthermia Workshop  
 1994-01 Board of Directors, North American Malignant Hyperthermia Registry  
 1995-2009 TELTECH Technical Knowledge Service  
 1998 Textbook Reviewer: Principles of Anatomy and Physiology, 8th edition  
 1999-05 Medical Advisory Board, Spinal Designs International  
 1999-Present Consultant, Medtronic  
 2004-Present Research Committee, LifeSource, Upper Midwest Organ Procurement Organization  
 2005-Present Special Issue Associate Editor, Journal of Biomechanical Engineering and Medical Devices, ASME  
 2007-Present Associate Editor, Journal of Medical Devices, ASME  
 2008-Present Member of Technical Committee on Cardio-Pulmonary Systems, IEEE Engineering in Medicine and Biology Society  
 2008-2010 Chair of Technical Committee on Cardio-Pulmonary Systems, IEEE Engineering in Medicine and Biology Society

2008-2010	Track Chair and Co-Chair on Cardio-Pulmonary Systems, IEEE Engineering in Medicine and Biology Society, 2009, 2010
2008-2009	Theme Chair on Cardiovascular & Respiratory System Engineering, 31 <sup>st</sup> International Conference of the IEEE EMBS, September 2009
2009-2014	Executive editor of the Journal of Cardiovascular Translational Research
2009-Present	Organizing Committee of the Innovations in Cardiovascular Interventions (ICI), annual meeting and workshop
2012-2014	Education Subcommittee of the American Institute for Medical and Biological Engineering

### **JOURNAL REFEREE**

1989-Present	Muscle & Nerve
1990-Present	Anesthesiology
1992-Present	Anesthesia and Analgesia
1992-Present	Acta Anaesthesiologica Scandinavica
1994-Present	Journal of Applied Physiology
1994-Present	Liver Transplantation and Surgery
1995-Present	Mayo Clinic Proceedings
1998-Present	Wound Repair and Regeneration
1999-Present	IEEE Transactions on Medical Imaging
2000-Present	IEEE Transactions on Biomedical Engineering
2001-Present	Journal of Cardiovascular Pharmacology
2002-Present	Annals of Thoracic Surgery
2003-Present	Animal Science
2004-Present	BioMed Central Musculoskeletal Disorders
2004-Present	Current Pharmaceutical Design
2005-Present	Physiological Genomics
2005-Present	Journal of Biomechanical Engineering
2006-Present	Journal of Medical Devices
2007-Present	Medical Physics
2008-Present	Annals of Biomedical Engineering
2009-Present	Journal of Cardiovascular Translational Research
2010-Present	Interventional Cardiology
2010-Present	The Anatomical Record
2011-Present	International Journal of Hyperthermia
2011-Present	Clinical Anatomy
2012-Present	Heart
2012-Present	Regulatory Peptides
2012-Present	Anesthesiology Research and Practice
2012-Present	Journal of Translational Engineering in Health and Research
2012-Present	Journal of Experimental Biology
2012-Present	Journal of Medical Physics
2013-Present	Journal of Cardiovascular Engineering

## UNIVERSITY AND DEPARTMENTAL ACTIVITIES

### UNIVERSITY ACTIVITIES: ACADEMIC HEALTH CENTER

- 1991-94 Mentor for Advanced Admission Students (Program ended 1994)
- 1996-Present UMHS Minority Program: High School Research Apprentice Program
- 1998-99 Catalyst Program (project of the 2001 Medical School class)
- 1999-01 Stem Cell Institute Search Committee
- 2000-Present Faculty Interviewer: Medical School Admissions
- 2004-Present Interviewer: Medical School, Pre-medical Scholars Program
- 2005-2008 Ad Hoc Committee on Space for Biomedical Engineering/Medical Device Center  
(Erdman, Iaizzo, Kaveh, Keller, McCullough, Moldow, Wederstrom, Tranquillo)

### UNIVERSITY ACTIVITIES: BIOMEDICAL ENGINEERING

- 1993-Present Graduate Faculty in Biomedical Engineering
- 1994-95 Faculty Advisory Panel to the Biomedical Engineering Center
- 1994 Biomedical Interfacial Engineering Task Force
- 1995-Present Core Faculty of the Biomedical Engineering Institute
- 1997-Present Chair, Nominations Committee
- 1998-00 Undergraduate Degree and Curriculum Committee
- 1999-00 Biomedical Engineering Space Committee
- 2000-01 Executive and Program Committees, "Minnesota's Medical Device Community Forum: Design of Medical Devices"
- 2001-03 Membership Committee, Biomedical Engineering Institute
- 2001-Present Faculty Advisory Board, Institute for Engineering in Medicine (formally BMEI)
- 2001-Present Program Committee, Design of Medical Devices Conference, University of Minnesota
- 2003-2010 Group Leader, Cardiovascular Physiology, Institute for Engineering in Medicine
- 2003-2010 Program Chair, President's Commissioned Conferences on Medical Devices  
2004: "Maintaining Minnesota as the Leader in the Medical Device Industry;" 2005: "Leading the Change for Breakthroughs in Health through Medical Device Advancements;" 2006: "Medical Devices for Delivering the New Biology;" 2007: "Inventing Medical Devices;" 2008: "Lifelong Learning of the Medical Device Engineer;" 2009: "Translational Research: From Prototype to Product"
- 2004-2010 Local Organizing Committee, Joint Meeting of 5<sup>th</sup> International Conference on Bioelectromagnetism & 5<sup>th</sup> International Symposium on Noninvasive Functional Source Imaging within the Human Brain and Heart
- 2004-06 Co-organizer, Midwest Chapter of the Biomedical Engineering Society
- 2005-07 Ad-hoc member of Medical Devices Planning Committee
- 2007-Present Academic Advisory Board, Medical Devices Center
- 2011-2012 Search Committee for Director of Institute for Engineering in Medicine

### UNIVERSITY ACTIVITIES: LILLEHEI HEART INSTITUTE

- 2002-2014 Director of Education
- 2002-Present Steering Committee Member

### UNIVERSITY ACTIVITIES: OTHER

- 1992-96 Faculty Advisor, Center for Interfacial Engineering Small Company Program, supported by NSF

1992-99	Project Leader, Research Explorations: "Biomedical Research on Diseases of Muscle," CEE
1994-Present	President's Distinguished Faculty Mentor Program
1994-Present	Teaching Opportunity Program for Doctoral Students (TOPDS)
1995-Present	Undergraduate Research Opportunity Program (UROP)
1995-Present	University of Minnesota Alumni Association Mentor Program
1998-05	Page Education Foundation's Senior Mentor Program
2004-06	Twin Cities Campus Assembly, Advisory Committee on Athletics

#### **DEPARTMENTAL ACTIVITIES: SURGERY**

2002-2015	Staff, Experimental Surgical Services
2005-06	Faculty Recruitment, Development, and Retention Committee
2005-2015	Development and Fundraising Committee
2006-07	Search Committee for Head of Cardiovascular Surgery
2007-2015	Executive Research Council
2007	Founder of annual "Bakken Surgical Device Symposium"
2007-Present	Organizing Committee of "Bakken Surgical Device Symposium"

#### **DEPARTMENTAL ACTIVITIES: INTEGRATIVE BIOLOGY AND PHYSIOLOGY**

1993-Present	Graduate Faculty, Cellular and Integrative Physiology
1994-00	Faculty Evaluation Committee
2000-06	Physiology Industrial Advisory Board
2006-07	Search Committee for new Professor and Head

#### **DEPARTMENTAL ACTIVITIES: ANESTHESIOLOGY**

1990-01	Coordinator, Bi-monthly Research Conferences
1990-present	Director, Malignant Hyperthermia Clinical Diagnostic Laboratory
1990-96	Coordinator, Malignant Hyperthermia Journal Club
1991-93	Chairman of Research Committee
1991-01	Coordinator, Annual Clinical Symposium
1991-01	Coordinator, Undergraduate Summer Research Fellowship
1991-01	Research Committee
1992-01	Coordinator for Laboratory Safety
1995-01	Continuing Education Committee
1996-01	Chairman of Research Committee

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#### **RESEARCH INTERESTS**

1. Physiology of skeletal and cardiac muscle (in vivo, in situ and in vitro)
2. Pathophysiology of human skeletal muscle (malignant hyperthermia, myotonic dystrophy, recessive generalized myotonia, myotonia congenita, Schwartz-Jampel syndrome, paramyotonia, hyperkalemic periodic paralysis, and hypokalemic periodic paralysis)
3. Effects of anesthetic agents on the function of extrafusal and intrafusal skeletal muscle and cardiac muscle
4. Development of novel instrumentation and biomedical devices for physiological monitoring, clinical evaluation, and/or therapeutic use

5. Role of elevated intracellular [Ca<sup>2+</sup>] in: 1) cell signaling; 2) dystrophic processes within skeletal muscle; and 3) cell toxicity
6. Physiological and pathological oscillations of the musculoskeletal system (tremor, shiver and clonus)
7. Anesthetic effects on the physiology of thermoregulation and biomedical applications of heat transfer in humans
8. Noninvasive and invasive correlates of wound formation, status, healing and prevention: development of animal models, effects of anesthetics, and design of biomedical instrumentation
9. Cervical and lumbar spinal cord biomechanics and management of back pain

### OUTSIDE INTERESTS AND ACTIVITIES

1. Running, tennis, biking, and hiking (bear dens, searching for mushrooms, chaga)
2. Fishing and fly-fishing
3. Coaching soccer: club teams, both outdoor and indoor; E-level coaching license
4. Coaching basketball: recreational teams (since 1993): school, AAU and travel club teams; 1997 Girls 7A (State Champions); 1998 Girls 8A (State Champions); 1998 Girls 6AA (State Runner-ups); 1999 Girls 7AAA (State Champions); 2000 Girls 8AAA (State Champions); 2004 Girls 8AAA (State Runner-ups)
5. Gardening, home repairs, and woodworking

### FORMAL CLASSROOM TEACHING

- 1992-Present University of Minnesota, Minneapolis, MN, Medical School: **Anesthesiology Residents, (2 hours).**  
*Topic: Skeletal muscle physiology*
- 1993-Present University of Minnesota, Minneapolis, MN: **BMEN 8970, Literature Seminar: Biomedical Journal Club at weekly laboratory meetings (15 hours)**
- 1994-Present University of Minnesota, Minneapolis, MN: **(Course Originator and Director) BMEN 5371/5701, Biomedical Application of Heat Transfer in Humans (10 hours, offered every other year)**  
*Lecture topics: Course introduction; composition of the human body; biology of skin; physiology of thermoregulation; consequences of hypothermia or hyperthermia; treatment of hypothermia or hyperthermia; malignant hyperthermia; applications of IR imaging (live demo)*
- 1996-Present University of Minnesota, Minneapolis, MN, Biomedical Engineering and the Carlson School of Management: **BMEN 8401-8402, ME 8221-8222, ENTR 6041-6042, New Product Design and Business Development (5-8 hours per week; fall and spring semesters)**  
*Lecture topics: Course introduction; designing medical devices and clinical testing. Faculty Mentor for Teams: (1996-97) Spinal Designs International and Augustine Medical Inc.; (1997-98) Augustine Medical Inc., Select Comfort, and Sulzer Medical; (1998-99) Medtronic, Shepherd Medical, and Sulzer Medical; (1999-00) Medtronic and EnduraTEC; (2000-01) Medtronic CRM; (2001-02) 3M Surgical; (2002-03) 3M Surgical; (2003-04) Arctic Cat; (2004-05) Medtronic CRDM; (2005-06) Medtronic CRDM; (2006-07) Medtronic Cardiac Surgery; (2007-08) Augustine*



*Biomedical and Design; (2008-10) Medtronic Cardiac Surgery; (2010-18) Medtronic*

- 1996-Present University of Minnesota, Minneapolis, MN: **Neuroscience 5100/4185/5551 (1 week at Itasca Biological Station, Course Director; 45+ contact hours)**  
*Lecture topics: Course introduction and lab notebooks; basic muscle contraction; dissection; neuromuscular junction; force assessment in humans; cardiac muscle (isolated heart studies)*
- 1999-Present University of Minnesota, Minneapolis, MN, Medical School, 1st Year: **Physiology 5111-5112, Physiology Laboratory (10 hours, Winter Quarter)**  
*Lecture topics: Stimulated muscle force assessment; ex vivo four-chamber working swine heart model*
- 2000-Present University of Minnesota, Minneapolis, MN: **(Course Originator and Director) PHSL 5510, Advanced Cardiac Physiology and Anatomy (10 hours)**  
*Lecture topics: Course introduction and review of the cardiovascular system; cellular (conduction system and arrhythmias); autonomic nervous system and cardiac function; Visible Heart®; fresh cadaver demo; demo of open-heart surgery in a swine (small groups)*
- 2000-Present University of Minnesota, Minneapolis, MN, Dental School: **Dent 8440, TMJ and Craniofacial Pain: Advanced Theory and Principles (3 hours)**  
*Lecture topics: Skeletal muscle physiology; skeletal muscle patho-mechanisms*
- 2000-Present University of Minnesota, Minneapolis, MN: **Bioc/Phsl/NSc/MVB/BMEN 5444, Muscle (3 hours)**  
*Lecture topics: Visible Heart®; stimulated force assessment*
- 2001-Present University of Minnesota, Minneapolis, MN: **BMEN3701, Physiology Laboratory (15 hours)**  
*Lecture topics: Course introduction, BioPac systems and lab notebooks; cardiovascular system; skeletal muscle and force assessment; designing your own experiments*
- 2001-Present University of Minnesota, Minneapolis, MN: **BMEN 5041, Tissue Engineering (1 hour)**  
*Lecture topics: Mesenchymal tissues (muscle)*
- 2001-Present University of Minnesota, Minneapolis, MN: **BMEN 2602, Sophomore Seminar (2 hours)**  
*Topics: Laboratory tour; discussion of required animal testing for implanted medical devices*
- 2002-Present University of Minnesota, Minneapolis, MN: **Physiology 5511, The Neuromuscular Junction (10 hours)**  
*Lecture topics: Basic muscle contraction; nerve/muscle dissection; neuromuscular junction; force assessment in humans*
- 2007-Present University of Minnesota, Minneapolis, MN: Medical Industry Leadership Institute: **MILI 6990, Anatomy and Physiology for Managers**  
*Lecture topics: Cardiovascular system and devices*

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### PREVIOUS TEACHING EXPERIENCES

- 1980 College of St. Scholastica, Duluth, MN: Guest lecturer, Neurophysiology, Physical Therapy Students (2 hours). *Topic: Tremors and clonus*

- 1980 University of Minnesota School of Medicine, Duluth, MN: Guest lecturer, Human Physiology, Medical Students (3 hours). *Topics: Pathological oscillations and spinal cord injuries*
- 1981-82 University of Minnesota Health Sciences, Minneapolis, MN: Teaching Assistant, Human Physiology and Neurophysiology, Medical, Dental and Pharmacy Students (30 hours). *Topics: General physiology; cardiovascular system; muscle, respiratory and motor control*
- 1984-85 University of Minnesota School of Medicine, Duluth, MN: Guest lecturer, Animal Physiology (6 hours). *Topics: Sensory systems; skeletal muscle physiology; temperature regulation*
- 1984-85 University of Minnesota School of Medicine, Duluth, MN: Guest lecturer, Human Physiology, Medical Students (4 hours). *Topics: Motor control and pathological oscillations*
- 1989 Mayo Medical School, Pharmacology, Rochester, MN: Medical Students (1 hour). *Topic: Local anesthetics*
- 1989 College of St. Scholastica, Duluth, MN: Invited lecturer, Neurophysiology: Physical Therapy Students (7 hours). *Topics: Pain; anesthesia; vestibular system; hearing; ascending reticular activating system and sleep*
- 1989 University of Minnesota School of Medicine, Duluth, MN: Invited lecturer, Animal Physiology: ANS (5 hours). *Topics: Sensory physiology; programmed motor behavior*
- 1989 University of Minnesota School of Medicine, Duluth, MN: Invited lecturer; Human Physiology, Medical Students (8 hours). *Topics: Pain; anesthesia; vestibular system; hearing; ascending reticular activating system and sleep*
- 1990 Mayo Medical School, Rochester, MN: Invited lecturer in Pharmacology: Medical Students (1 hour). *Topic: Local anesthetics*
- 1992 University of Minnesota, Minneapolis, MN: *Physiology 5444, Muscle contraction* (4 hours). *Topic: Metabolism and excitation*
- 1992-2017 University of Minnesota, Minneapolis, MN: *Physiology 3053/3056/5441 Quantitative Physiology* (10 hours); *Physiology 3061/3071/5061, Principles of Physiology*  
*Lecture topics: Somatosensory systems and neuronal circuits; general anatomic and functional components of motor system; maintenance of upright posture and sense of equilibrium; complex integrative functions of motor system; pathophysiology of motor system; autonomic nervous system; hypothalamus and limbic system; ascending reticular activating system (sleep, pain); regulation of body temperature; vision, sound and hearing, taste, and smell*
- 1993-94 University of Minnesota College of Biological Sciences, Minneapolis, MN: Honors Seminar (15 hours). *Topic: Muscle diseases*
- 1994-99 University of Minnesota Medical School, Minneapolis, MN: Medical Student Rotation in Anesthesiology (1 hour). *Topic: Thermoregulation and consequences of anesthesia*
- 1996 Engineering, Fachhochschule Anhalt, Köthen, Germany: Engineering and Nutrition (15 hours). *Topic: Neurophysiology*
- 1996 University of Minnesota Medical School, Neurology, Minneapolis, MN: Scientific Basis of Neurology Course (1.5 hours). *Topic: Fundamentals of muscle physiology*

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| 1996 | College of St. Catherine, Minneapolis, MN: Master of Physical Therapy Program (24 hours and Course Director). <i>Topic: Applied physiology</i>                                     |
| 1999 | University of Minnesota Program in Physical Therapy, Minneapolis, MN: <i>PMed 8101, Physical Therapy</i> (3 hours, Winter Quarter). <i>Topic: Skeletal muscle force assessment</i> |
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## ADVISING RESPONSIBILITIES

### INTERNATIONAL GUEST RESEARCHERS

1. **Oliver Bandschapp, MD**, Visiting Scholar (10/07 to 11/07; 5/10 to 3/11) from Universitätsspitals Basel, Switzerland
2. **Hans M. Eichinger, PhD**, Visiting Scientist (7/91 to 8/91) from Versuchsstation Thalhausen, Technische Universität München, W-8051 Kranzberg, Germany. Funded via Cooperative Research Project Grant of the Organization for Economic Cooperation and Development, Paris, France
3. **Federica Sacco, PhD**, Visiting Doctoral Candidate (9/18 to 12/18) from University of Pompeo Fabra, Spain
4. **Alfonso Santiago, PhD**, Visiting Doctoral Candidate (11/18 to 12/18) from University of Pompeo Fabra, Spain
5. **Markus J. Seewald, PhD**, Visiting Scientist (7/91 to 8/91; 9/95) from Abteilung für Allgemeine Physiologie, Universität von Ulm, Oberer Eselberg, 7900 Ulm, Germany. Funded via grant from Boehringer Ingelheim
6. **Hiroshi Yamada, MD**, Visiting Scientist in Orthopedic Surgery and Anesthesiology (6/92 to 11/93) from Wakayama Medical College, Wakayama, Japan. Supported via fellowship from the Nanki Scholarship Fund, Japan

### RESEARCH AND POST-DOCTORAL FELLOWS AND ASSOCIATES

1. **Shancy Augustine, PhD**, Electrical and Computer Engineering, University of Florida, Postdoctoral Volunteer (4/15 to 12/15); Lead Scientist/BioMEMS/Microfluidics Engineer, Achira Labs Pvt. Ltd. (India)
2. **Oliver Bandschapp, MD**, Post-doctoral Fellow in Surgery (4/10 to 3/11); Anesthesiologist, University of Basel, Switzerland
3. **George Bojanov, MD**, Cardiac Fellow in Anesthesiology (7/99 to 7/00), Department of Anesthesiology, University of Minnesota. Departmental support via funds from Minnesota Medical Foundation; Anesthesiologist, Twin Cities Anesthesia Associates PA, MN
4. **Jason Johnson**, Resident Physician, Anesthesiology (9/06 to 5/07); University of Minnesota
5. **M.V. Shailesh Kumar, PhD**, Post-doctoral Fellow in Anesthesiology (8/96 to 5/99), National Institute of Mental Health and Neurosciences, Bangalore University, India; Principal Scientist, Medtronic, MN
6. **Xiaohuan (Rebecca) Li, MD**, Post-doctoral Fellow in Surgery (8/06 to 5/11)
7. **Michael Loushin, MD**, Chief Resident in Anesthesiology, University of Minnesota (12/01 to 6/02); Anesthesiologist, Twin Cities Anesthesia Associates PA, MN
8. **Daniel C. Sigg, MD**, Post-doctoral Fellow in Anesthesiology (8/97 to 6/99), Department of Anesthesiology, University of Basel, Switzerland. Supported via fellowship from the Swiss National Research Foundation; Professional Photographer, Self employed, MN
9. **John R. Spratt**, General Surgery Resident, University of Minnesota (8/15 to 7/17); University of Minnesota

10. **Robert S. Zink, MD**, Research Fellow (7/91 to 6/92); Clinical practice in Wisconsin

#### **CURRENT DOCTORAL STUDENTS**

1. **Renee Brigham**, Doctoral student in Biomedical Engineering (1/19 to present)
2. **Alex Deakyne**, Doctoral student in Bioinformatics & Computational Biology (1/19 to present)
3. **Mikayle A. Holm**, Doctoral candidate in Biomedical Engineering (11/16 to present)
4. **David Ramirez**, Doctoral student in Biomedical Engineering (11/17 to present)
5. **Emma Schinstock**, Doctoral student in Biomedical Engineering (5/18 to present)
6. **Amanda Tenhoff**, Doctoral student in Biomedical Engineering (1/19 to present)
7. **Tommy Valenzuela III**, Doctoral student in Biomedical Engineering (9/17 to present)
8. **Jorge D. Zhingre Sánchez**, Doctoral candidate in Biomedical Engineering (11/16 to present)

#### **DOCTORAL STUDENTS WITH COMPLETED DEGREES**

1. **Sarah E. Ahlberg, PhD**, Doctoral degree in Biomedical Engineering (1/04 to 4/07), Thesis: "Investigation of the influence of long and short term cardiac pacing from alternate sites on the electrical and mechanical performance of the heart in the *in vivo* animal model." Senior Research Manager, Medtronic, MN
2. **Sara E. Anderson, PhD**, Doctoral degree in Biomedical Engineering (12/04 to 4/08), Thesis: "Effects of pacing lead position and cardiac anatomy on left ventricular venous pacing." Global R&D Sensor Director, Medtronic Covidien, CO
3. **Michael G. Bateman, PhD**, Doctoral degree in Biomedical Engineering (9/07 to 5/12), Thesis: "Investigations into the effects of transcatheter valve implantations on the cardiac conduction system and cardiac anatomy." Principal Test Development Engineer, Cardiovascular Systems, Inc., MN
4. **Mark A. Benscoter, PhD, MBA**, Doctoral degree in Biomedical Engineering (1/09 to 4/15), Thesis: "Study of atrial septal puncture and monophasic action potential contact force for medical device **enhancements** to improve ablation procedure outcomes." Electronics & Safety Engineering Unit Head, Mayo Clinic, MN
5. **Edward C. Chinchoy, PhD, Doctoral degree in Biomedical Engineering (12/96 to 12/99)**. Thesis: "An ex vivo four chamber working swine heart model." President, VisCardia, 3VO, CA
6. **James A. Coles Jr., PhD**, Doctoral degree in Biomedical Engineering (4/00 to 9/02). Thesis: "Pharmacological approaches to cardioprotection." Director Global Downstream Marketing, Medtronic, MN
7. **Michael D. Eggen, PhD**, Doctoral degree in Biomedical Engineering (1/06 to 10/09). Thesis: "**Heart failure and associated structural and functional remodeling: assessment employing** various magnetic resonance imaging methodologies." Senior Principal Mechanical Engineer, Medtronic, MN
8. **Jon H. Falkenberg, PhD**, Doctoral degree in Cellular and Integrative Physiology (12/97 to 9/00). Thesis: "Assessment and treatment of disorders of the spinal musculoskeletal system." Deceased 2011
9. **Sarah A. Frommer, PhD**, Doctoral degree in Biomedical Engineering (7/01 to 3/07). Thesis: "Investigating the use of multipotent adult progenitor cells for treatment of Sucheneen muscular dystrophy: a translational approach." Co-Advisor Catherine M. Verfaillie, MD, University of Minnesota Medical School MD/PhD program. Plastic Surgeon, Craniofacial Team of Texas

10. **Erik N. Gaasedelen**, Doctoral student in Bioinformatics and Computational Biology (8/15 to 6/19). “Deep Learning and Virtual Reality in the Surgical Sciences.” Lyft self driving division Level 5, Palo Alto, CA
11. **Ryan P. Goff, PhD**, Doctoral degree in Biomedical Engineering (11/09 to 3/14). Thesis: “Studies of cryothermal ablation for the treatment of atrial fibrillation.” Program Manager, R & D, CryoLife, Inc., TX
12. **Gary L. Hansen, PhD**, Doctoral degree in Biomedical Engineering (6/93 to 11/95). Thesis: “Evaluation of cutaneous and deep tissue injuries using computer imaging.” Director of R&D, Arizant Healthcare Inc., MN
13. **Alexander J. Hill, PhD**, Doctoral degree in Biomedical Engineering (1/99 to 11/03). Thesis: “Large mammalian comparative cardiac anatomy.” Senior Program Director, Medtronic, MN
14. **Jin Back Hong, PhD**, Doctoral degree in Biomedical Engineering (9/98 to 1/03). Thesis: “The development of outcomes diagnostic measurement and potential therapies on patients with a neuromuscular disorder and/or skeletal muscle weakness.” Principal Consultant/Scientist, Medtronic, MN
15. **Brian T. Howard, PhD**, Doctoral degree in Biomedical Engineering (5/12 to 7/16). Thesis: “Investigative applications of isolated cardiopulmonary systems.” Senior Biomedical Engineer, Medtronic, MN
16. **Stephen A. Howard, PhD**, Doctoral degree in Biomedical Engineering (9/08 to 8/13). Thesis: “Interatrial septal anatomy, physiology and biomechanics: implications for percutaneous delivery of cardiac devices.” Principal Systems Engineer, Medtronic, MN
17. **Tinen L. Iles**, Doctoral degree in Bioinformatics & Computational Biology (8/15 to 11/17). Thesis: “Big data analyses to identify physiologic adaptive responses in the American Black Bear (*Ursus americanus*): from basic biological knowledge to clinical applications.” Assistant Professor, University of Minnesota, MN
18. **Michael W. Kimmel, PhD**, Doctoral degree in Biomedical Engineering (12/02 to 4/07). Thesis: “Swine models for study and optimization of biventricular pacing therapies as treatments for heart failure.” Senior R&D Engineer, Medtronic, MN
19. **Jaydeep Y. Kokate, PhD**, Doctoral degree in Biomedical Engineering (1/93 to 12/96). Thesis: “Critical thresholds for causation of cutaneous and subcutaneous injury in a porcine model: experimental and numerical approaches.” Director of Research and Development, Boston Scientific, MN
20. **Timothy G. Laske, PhD**, Doctoral degree in Biomedical Engineering (5/00 to 3/04). Thesis: “The application of an isolated perfused working heart model to the design of endocardial pacing systems.” Vice President of Research and Business Development, Medtronic, MN
21. **Alexander R. Mattson, PhD**, Doctoral degree in Biomedical Engineering (11/14 to 7/18). Thesis: “Anatomical, biomechanical, and end-of-life considerations for emergent cardiac pacing technologies.” Senior Scientist, Medtronic, MN
22. **Lars M. Mattison**, Doctoral degree in Biomedical Engineering (11/13 to 1/19). Thesis: “An examination of the cardiothoracic tissue biophysical response to electroporation therapies.” Scientist, Medtronic, MN
23. **Stephen G. Quallich, PhD**, Doctoral degree in Biomedical Engineering (11/11 to 9/15). Thesis: “Studies of ablation complications during the treatment of atrial fibrillation.” Quality Program Manager, Medtronic MN
24. **Jason L. Quill, PhD**, Doctoral degree in Biomedical Engineering (9/05 to 5/09). Thesis: “Applications of the Visible Heart for cardiac valve repair and replacement devices.” Project Team Leader (atrial fibrillation treatment), AtriCure, Inc. MN

25. **Eric S. Richardson, PhD**, Doctoral degree in Biomedical Engineering (9/05 to 5/09). Thesis: "Intrapericardial delivery of anti-arrhythmic agents." Associate Professor, Duke University, NC
26. **Christopher D. Rolfes, PhD**, Doctoral degree in Biomedical Engineering (11/07 to 5/12). Thesis: "Intrapericardial delivery of omega-3 polyunsaturated fatty acids." Senior Program Manager, T3labs (Translational Testing and Training Laboratories), GA
27. **Megan M. Schmidt, PhD**, Doctoral in Biomedical Engineering (11/13 to 4/18). Thesis: "Utility of monophasic action potentials in the diagnosis and treatment of cardiac arrhythmias." Senior Scientist, Medtronic, MN
28. **Maneesh Shrivastav, PhD**, Doctoral degree in Biomedical Engineering (11/04 to 4/07). Thesis: "The monophasic action potential: an investigation of ischemic cardiomyopathy." Director of Market Development (Medical Devices), Medtronic, MN
29. **Daniel C. Sigg, MD, PhD**, Doctoral degree in Cellular and Integrative Physiology (6/99 to 12/01). Thesis: "Pharmacological preconditioning with opioids for myocardial protection" Professional Photographer, Self employed, MN
30. **Ashish Singal, PhD**, Doctoral degree in Biomedical Engineering (1/08 to 8/14). Thesis: "The comparative assessment of clinical ablative therapies: effects on physiological and biomechanical properties of tissues in response to therapeutic doses." Medical student
31. **Nicholas D. Skadsberg, PhD**, Doctoral degree in Biomedical Engineering (3/03 to 12/04). Thesis: "Single site cardiac pacing: influence of pacing site on electrophysiology and performance in the normal swine heart." Global Downstream Marketing Director-AF Solutions, Medtronic, MN
32. **Julianne H. Spencer**, Doctoral degree in Biomedical Engineering (11/09 to 11/13). Thesis: "The implications and effects of coronary venous anatomy on clinical interventions." Principal Scientist, Medtronic, MN

#### **CURRENT MASTERS STUDENTS**

1. **Alyssa Jackson**, MS student in Biomedical Engineering (2/14 to present)

#### **MASTERS STUDENTS WITH COMPLETED DEGREES**

1. **Matthew Adams**, MS in Biomedical Engineering (1/02 to 6/05). Vice President and General Manager, Minnetronix Neuro, MN
2. **Ivan Akunovich**, MS in Biomedical Engineering (6/11 to 6/12). Senior Program Manager, Epic Sciences, CA
3. **Lina Alzate**, MD, MS in Biomedical Engineering (10/01 to 6/03). Senior Director Safety Operations, Johnson & Johnson, Medical Devices, FL
4. **Sara Anderson**, MS in Biomedical Engineering (12/04 to 2/06). Global R&D Sensor Director, Medtronic Covidien, CO
5. **Sally Anzelc**, MS in Biomedical Engineering (7/08 to 11/08). President, Quality Foundations LLC, MN
6. **Lindsey Arndt**, MS in Biomedical Engineering (9/17 to 5/18). Systems Engineer, Restorative Therapies, Medtronic, MN
7. **Brent Barnstuble**, MS in Biomedical Engineering (4/00 to 5/02). Family Medicine Physician, MN
8. **Esha Bhargava**, MS student in Health Informatics (9/05 to 6/06). Vice President, Experience Research, Ascension, IL

9. **Tom Brass**, MS in Biomedical Engineering (1/94 to 10/95). Senior Systems Engineer, Saint Bernard Engineering Inc., MN
10. **Josh Brauer**, MS in Biomedical Engineering (1/00 to 7/01). Internal Medicine Physician, The Permanente Medical Group, CO
11. **Robin Brusen**, MS in Biomedical Engineering (5/08 to 5/10), MD/MS program. General Cardiologist, Kaiser Permanente, WA
12. **Robert Buechler**, MS in Biomedical Engineering (9/10 to 10/13). Medtronic, MN
13. **Maria Burbano**, **MS in Biomedical Engineering (9/15 to 6/17). Global Field Service and Technical Support Engineer, Medtronic, MN**
14. **Angela Burgess**, MS in Biomedical Engineering (9/17 to 5/18). Mechanical Design Engineer, Medtronic, MN
15. **Edward C. Chinchoy**, MS in Mechanical Engineering (6/95 to 12/96). Executive Vice President, VisCardia, OR; **Founder and CEO, 3VO, CA**
16. **Woohyek Choi**, MS in Electrical Engineering (3/99 to 6/00). Leader of HW Development Group, Philosys, Korea
17. **James A. Coles Jr**, MS in Biomedical Engineering (1/99 to 7/00). Director of Global Downstream Marketing, Medtronic, MN
18. **Alex Deakyne**, MS in Bioinformatics & Computational Biology (6/18 to 1/19). Research Scientist, Visible Heart Laboratories, MN
19. **Anthony Dupre**, MS in Biomedical Engineering (12/02 to 12/04). Senior R&D Engineer, St. Jude Medical, MN
20. **Salah El Haddi**, MD/MS Program, (1/14 to 11/17). Surgical Resident, University of Michigan, MI
21. **Jon Falkenberg**, MS in Physiology (8/95 to 12/97). Deceased 2011
22. **Kevin Fitzgerald**, MS in Biomedical Engineering (9/02 to 5/04). Program Manager, Medtronic Surgical Technologies, CO
23. **Yan Gao**, MS in Mechanical Engineering (2/93 to 8/95)
24. **Sarah Hamlin**, MS in Biomedical Engineering (9/17 to 5/18). Reliability Engineer, Medtronic, MN
25. **Sarah Handahl (Ahlberg)**, MS in Biomedical Engineering (1/04 to 5/05). Senior Research Manager, Medtronic, MN
26. **Megan Harris**, MS in Biomedical Engineering (7/15 to 6/17). Scientist, Medtronic, MN
27. **Alexander J. Hill**, MS in Biomedical Engineering (1/99 to 9/00). Senior Program Director, Medtronic, MN
28. **Ross Hinrichsen**, MS in Biomedical Engineering (5/15 to 5/16). Mechanical Design Engineer, Medtronic, MN
29. **Bryce Cole Holmgren**, MS in Biomedical Engineering, Plan B (5/12 to 5/14), Medical student (MD/MS Program). Anesthesiologist, KS
30. **Jin Back Hong**, MS in Electrical Engineering (4/97 to 9/98). Principal Consultant/Scientist, Medtronic, MN
31. **Tinen L. Iles**, MS in Biological Science (8/13 to 5/15). Assistant Professor, Visible Heart Laboratories, MN
32. **Aaron Janke**, MS in Biomedical Engineering (11/94 to 6/96). Field Clinical Studies Engineer, Biotronik Inc, MI
33. **Yong Jeon**, MS in Biomedical Engineering (7/93 to 7/95). Owner/Consultant, Tulip Engineering, CA

34. **Evan Johnson**, MS in Biomedical Engineering (8/15 to 6/17). Hardware Engineer, Medtronic, MN
35. **Traci Jones (Kress)**, MS in Biomedical Engineering (1/16 to 5/17). Senior Pre-Market Reliability Engineer, Medtronic, MN
36. **Shanthi Kandikonda**, MS in Computer Science (1/08 to 5/08). Senior Manager, Identity and Access Management, Charles Schwab, TX
37. **Jaydeep Kokate**, MS in Biomedical Engineering (1/93 to 8/93). Director of Research and Development, Boston Scientific, MN
38. **Narasimhararo Kommamuri**, MS in Biomedical Engineering (7/93 to 1/97). Software Engineer, Abbott Diabetes Care Inc., CA
39. **Graig Kveen**, MS in Biomedical Engineering (6/93 to 12/95). R&D Engineer, 3M, MN
40. **Ryan Lahm**, MS in Biomedical Engineering (1/97 to 6/99). Senior Engineering Manager and Technical Fellow, Medtronic, MN
41. **George Mallin**, MS in Mechanical Engineering (1/10 to 3/11). Product Manager, Optina Diagnostics, Montreal
42. **Mark Marshall**, MS in Physiology (12/02 to 5/10). Technology Manager and Researcher, Medtronic, MN
43. **Amanda Martel (Wilson)**, MS in Biomedical Engineering (11/09 to 4/12). Senior Engineering Director, Medtronic, MN
44. **Lizzie Mattson**, MS in Biomedical Engineering (8/17 to 5/18). Systems Engineer, Medtronic, MN
45. **Miles McParland**, MS in Biomedical Engineering (12/16 to 12/17). Scientist, Medtronic, MN
46. **Judy A. Miller**, MS in Biomedical Engineering (6/00 to 1/02)
47. **Nathalie Odryzynski**, MS in Biomedical Engineering (11/99 to 7/01). Reliability Engineering Manager, Medtronic, MN
48. **Ky O'Rourke**, MS in Biomedical Engineering (1/18 to 12/18). Quality Engineer, Medtronic, MN
49. **Sara Overgaard**, MS in Mechanical Engineering (12/05 to 5/08). Safety Program Manager, Medtronic, MN
50. **Suman Pal**, MS in Biomedical Engineering (1/07 to 8/08). Senior District Service Manager, Medtronic, OH
51. **Susan Paquette**, MS in Physiology (12/02 to 1/07). Vice President and General Manager, Wound Care, BioMedGPS, LLC, MN
52. **Xavier Pardo**, MS in Mechanical Engineering (3/97 to 9/99). Global Medical Technology Executive, Neo Medical SA, Switzerland
53. **Meenal S. Pathak**, MS in Biomedical Engineering (4/96 to 3/98)
54. **Rian J. Podein**, MS in Physiology (6/96 to 12/97)
55. **Christopher Quinn**, MS in Biomedical Engineering (11/97 to 6/99). Chief Technical Engineer, Smiths Medical, MN
56. **Ali Rafiq**, MS in Biomedical Engineering (10/14 to 7/15). Manufacturing Engineer, The Tech Group, AZ
57. **Jeremy Riedesel**, MS in Biomedical Engineering (1/97 to 12/98). Family Medicine Physician, Family Health Medical Services PLLC, NY
58. **Kaileigh Rock**, MS in Biomedical Engineering (8/17 to 1/19). Research Contingent, Medtronic CRT, MN
59. **Lance Rongstad**, MS in Biomedical Engineering (2/14 to 8/17). Medical Device Sales Representative, Gemini Medical/Arthrex, MN



60. **Alex Ryan**, MS in Mechanical Engineering (5/10 to 9/11)
61. **Justin Schaffer**, MS in Biomedical Engineering (6/06 to 8/06). Cardiothoracic Surgeon, Cardiac Surgery Specialists, TX
62. **Tony Schmitz**, MS in Biomedical Engineering (8/15 to 5/17). Reliability Engineer, Medtronic, MN
63. **Douglas Seiffert**, MS in Mechanical Engineering (6/93 to 12/94). Manager of Quality Assurance, Janssen, Pharmaceutical Companies of Johnson & Johnson, NJ
64. **Brice Shireman**, Graduate research fellow in the Center for Interfacial Engineering via the National Science Foundation (7/92 to 9/93), MS in Bioengineering (to 6/94). SciMed, Boston Scientific, MN
65. **Nicholas Skadsberg**, MS in Biomedical Engineering (9/01 to 3/03). Global Downstream Marketing Director-AF Solutions, Medtronic, MN
66. **Scott Skorupa**, MS in Biomedical Engineering (3/08 to 12/15); did not complete degree. Senior Manager, Clinical Project Management, Abbott, MN
67. **Laura Slobotski**, MS in Biomedical Engineering (7/93 to 7/95). Sprint Technology, TX
68. **Jerome Socha**, MS in Biomedical Engineering (granted 3/03). Systems Engineer, Lockheed Martin, TX
69. **Charles Soule**, MS Biology, CBS (12/01 to 6/05). Quality Control Chemist, Interplastic Corp., MN
70. **Vincent Splett**, MS in Physiology (1/06 to 9/07). Principal Scientist, Medtronic, MN
71. **Marc Steckler**, MS in Biomedical Engineering (8/08 to 5/09). Principal Systems Engineer, Medtronic, MN
72. **Jeremy Stimack**, MS in Biomedical Engineering (9/15 to 7/16). R&D Engineer II, Boston Scientific, MN
73. **Dona Suardini**, MS in Biomedical Engineering (11/12 to 7/13). Senior Operations Program Manager, Medtronic, MN
74. **Susan Sun**, MD/MS Program (9/16 to 6/17). University of Minnesota Medical School
75. **Matthew Sweney**, MD, MS in Biomedical Engineering (1/99 to 9/00). Pediatric Neurologist and Epileptologist, University of Utah, UT
76. **Samira Tahvildari**, MS in Mechanical Engineering (3/98 to 2/00). Senior Manager Core Quality Services, Medtronic, MN
77. **Matt Venegoni**, MS, Masters Capstone Project (8/11 to 5/12). Clinical Study Manager, Wright Medical, MN
78. **Sarah Vincent**, MS in Biomedical Engineering (11/02 to 9/04). Engineering Program Manager, Medtronic, MN
79. **Daniel Voce**, MS in Biomedical Engineering (9/18 to 5/19).
80. **Michael F. Wolf**, MS in Biomedical Engineering (9/06 to 12/09). Scientist and Technical Fellow, Medtronic, MN
81. **Matt Yoder**, MS in Biomedical Engineering (9/08 to 8/16). Principal Systems Engineer, Medtronic, MN

#### **CURRENT MEDICAL/VETERINARY MEDICINE STUDENTS**

None

#### **FORMER MEDICAL/VETERINARY MEDICINE STUDENTS**

1. **Johnathon Aho**, Medical student, University of Minnesota (2008-2009). General Surgeon, Mayo Clinic, MN

2. **Andrea Allen**, Medical student, University of Kansas (5/16 to 8/16). MD Candidate, University of Kansas, KS
3. **Corey Anderson**, Medical student/Research rotation, University of Minnesota (1/03 to 9/06). Anesthesiologist, Essentia Health, MN
4. **Greg Banker**, Medical student, University of Minnesota (8/13 to 10/13). Strategic Market Development Director, Vertiflex, MN
5. **Allison Bradee**, Medical student, University of Minnesota (10/11 to 9/12). Resident Physician, University of Nebraska Medical Center, NE
6. **Robin Brusen**, MD/MS program, University of Minnesota (5/08 to 5/10). General Cardiologist, Kaiser Permanente, WA
7. **Rachel Busko**, Medical student, University of Minnesota (5/16 to 2/17). Medical student, University of Minnesota, MN
8. **Brian Chan**, Medical student, Casual/temp employee (human heart atlas), University of Minnesota (6/09 to 9/09). Fellow in Musculoskeletal Imaging and Intervention, University of Wisconsin School of Medicine and Public Health, WI
9. **Nathan Charles**, MD/PhD program/Research assistant, University of Minnesota (5/03 to 8/03). Physician, Pathology (Anatomic & Clinical), Great Lakes Pathologists, SC, WI
10. **Chen Chen**, Medical student, University of Minnesota (5/15 to 9/15)
11. **Robert Colbert**, Medical student, University of Minnesota (5/13 to 1/14)
12. **Steve Conlon**, Medical student, University of Minnesota (1/12 to 5/13). Resident Physician, Nationwide Children's Hospital, MN
13. **William Dennehy**, Medical student, University of Minnesota (6/18 to 9/18). Medical student, University of Minnesota, MN
14. **Christopher DeNucci**, MD/PhD program/Research rotation, University of Minnesota (6/04 to 9/04). Radiologist, Meritus Health, TX
15. **Alex DiBartolomeo**, Medical student, University of Minnesota (1/16 to 2/17). Medical student, University of Minnesota, MN
16. **Chris Duncan**, Research assistant, University of Minnesota; funded by a grant from the Minnesota Medical Foundation (11/99 to 8/00). Anesthesiologist, Mayo Clinic, MN
17. **Cary Effertz, MS**, Research assistant, University of Minnesota (5/07 to 8/07). Pain Management Specialist/Anesthesiologist, Mayo Clinic, WI
18. **Ellie Engelen**, Veterinary medicine student, University of Minnesota (5/15 to 5/16). Associate Veterinarian, Forest Lake Veterinary Hospital, MN
19. **Anthony Frattalone**, Research assistant, University of Minnesota; recipient of Minnesota Medical Foundation student research grant (1/03 to 8/03). Neurologist, TX
20. **Sarah Frommer, PhD**, MD/PhD program/Research assistant, University of Minnesota (7/01 to 3/07). Plastic Surgeon, Craniofacial Team of Texas
21. **Andrew Geeslin**, Research volunteer, University of Minnesota (11/07 to 5/09). Orthopedic Surgeon, Sports Medicine, Borgess Health, MI
22. **Jeff Hall**, Medical student, University of New England College of Osteopathic Medicine, ME (5/17 to 7/17)
23. **Bryce Cole Holmgren**, Medical student (MD/MS Program), University of Minnesota (5/12 to 5/14). Anesthesiologist, KS
24. **Dih-Dih Huang**, Medical student, University of Minnesota (1/11 to 8/11). Surgery Resident, St. Joseph's Hospital, AZ
25. **Sandra Kopp**, Research assistant, University of Minnesota (8/96 to 5/99). Anesthesiologist, Mayo Clinic, MN

26. **Tarissa Lai**, Medical student, University of Minnesota (1/14 to 9/15). Medical student, University of Minnesota, MN
27. **Alice Lehman**, Medical student, University of Minnesota (5/13 to 10/13). Pediatrics Resident, University of Minnesota, MN
28. **Erica Levine**, Medical student, University of Minnesota (5/14 to 8/15). Medical Resident, University of Minnesota, MN
29. **Timothy Lindsey**, Medical student/Research rotation, University of Minnesota (9/01 to 12/01). Anesthesiologist, TRIA, MN
30. **Michael Loushin**, Advanced admission, University of Minnesota (9/93 to 9/94), Life Sciences Summer Research Programs (6/94 to 8/94), Research assistant (9/94 to 6/98). Twin Cities Anesthesia Associates, MN
31. **Katelyn Madigan**, Medical student, University of Minnesota (1/16 to 2/17). Medical student, University of Minnesota, MN
32. **Sarah Mott**, Medical student, Creighton (5/13 to 8/13). Emergency Medicine Physician, Regions Hospital, MN
33. **Cathy Nguyen**, Medical student, University of Minnesota (6/11 to 8/11)
34. **Zachary Novaczyk**, Medical student, University of Minnesota (5/18 to 9/18). Doctor of Medicine Candidate, University of Minnesota, MN
35. **Carrie Ronstrom**, Medical student, University of Minnesota (9/13 to 5/15). Medical student, University of Minnesota, MN
36. **Theresa Rosendahl**, MD/MPH program/Research assistant, University of Minnesota (8/05 to 6/06)
37. **Cori Russell**, Medical student, Casual/temp employee, University of Minnesota (5/09 to 9/09). Physician, Cardiology, Henry Ford Hospital and Medical Center, MI
38. **Carl Sakamoto**, Medical student research elective in Anesthesiology (3/93 to 5/94). Anesthesiologist, APA, MN
39. **Nathan Schoeneck**, Research volunteer, University of Minnesota (09/08 to 5/09). Assistant Professor, Internal Medicine, Minneapolis VA Medical Center, MN
40. **Maria Seewald**, Medical student, University of Magdeburg, Germany (9/15 to 10/16). Medical student, University of Magdeburg, Germany
41. **Kim Sergerie**, Medical student, McGill University, Montreal (9/16 to 10/16). Medical Science Advisor & Liason, Kinova, Quebec
42. **Erika Sidney**, Research assistant, University of Minnesota (8/98 to 4/99). Pediatric Emergency Medicine Physician, Children's Hospital Colorado, CO
43. **Miriam Smetak**, Medical student, University of Minnesota (6/14 to 5/15). Otolaryngology Resident, Vanderbilt University Medical Center, TN
44. **Bowei (LuLu) Song**, Medical student, University of Minnesota (4/16 to 8/16). Medical student, University of Minnesota, MN
45. **Collin Stinogel**, Medical student, Liberty University College of Osteopathic Medicine, VA (6/16 to 8/16). Medical student, VA
46. **Luke Stoltzfus**, Medical student/Research rotation; MMF research grantee, University of Minnesota (6/05 to 9/06). Anesthesiologist, St. Luke's, MN
47. **Jarrod Tembreull**, Medical student, University of Minnesota (1/15 to 9/15). Medical student, University of Minnesota, MN
48. **Jeff Theismann**, Medical student, University of Minnesota (1/15 to 9/15). Medical Resident, Orthopaedic Surgery, University of Minnesota, MN
49. **Kathryn Thomas**, Medical student, University of Minnesota (5/15 to 8/16)

50. **Chad Thompson**, Medical student, University of Minnesota (10/11 to 1/14)
51. **Mike Torchia**, Medical student, University of Minnesota (10/11 to 12/11). Orthopaedic Surgery Resident, Dartmouth-Hitchcock, NH
52. **Michael Tradewell**, Medical student, University of Minnesota (9/14 to 5/16). Medical student, University of Minnesota, MN
53. **Dan Virnig**, Research assistant, University of Minnesota (9/00 to 12/00). Gastroenterologist, HealthPartners, MN
54. **Gina Weiss**, Medical student, University of Minnesota (1/16 to 8/16). Medical student, University of Minnesota, MN
55. **Oh Sang (Michael) Woo**, Research volunteer, University of Minnesota (5/08 to 9/08)
56. **Melanie Yates**, Medical student, Case Western (5/16 to 8/16). Medical student, Case Western, OH

#### **CURRENT PHARMACY STUDENTS**

None

#### **FORMER PHARMACY STUDENTS**

1. **Andrea Bochna**, Pharmacy student, Research rotation, University of Wisconsin-Madison (8/16 to 10/16)
2. **Dustin Fredrickson**, Pharmacy student, Research rotation, University of Wisconsin-Madison School of Pharmacy (5/16 to 7/16)
3. **Taryn Hinnners**, Pharmacy student, Research rotation, University of Wisconsin-Madison (7/16 to 8/16). Pharmacist, Walgreens Specialty Pharmacy LLC, PA
4. **Alexander "AJ" Kellogg**, Pharmacy student, Research rotation, University of Wisconsin-Madison (1/17 to 4/17). Pharmacy Resident, University of Southern California School of Pharmacy, CA
5. **Anna Legreid Dopp**, PharMD, Research volunteer and PharMD program, 4<sup>th</sup> year research rotation, University of Minnesota School of Pharmacy (8/00 to 6/02). Director, Clinical Guidelines & Quality Improvement at the American Society of Health-System Pharmacists, MD
6. **Nate Menninga**, Pharmacy student, University of Wisconsin Madison (5/14 to 8/14). Clinical Pharmacy Specialist, William S. Middleton VA Hospital, WI
7. **Sarah Novak**, PharMD program, 4<sup>th</sup> year research rotation, University of Minnesota School of Pharmacy (6/02 to 8/02)
8. **Adam Remme**, Pharmacy student, Research rotation, University of Wisconsin-Madison (3/18 to 5/18)

#### **CURRENT NEUROSCIENCE STUDENTS**

1. **Ally Fuher**, Volunteer/Student employee (5/14 to present). Medical student, University of Minnesota, MN

#### **FORMER NEUROSCIENCE STUDENTS**

1. **Roman Tyshynsky**, PhD Neuroscience student, Research rotation, University of Minnesota (1/17 to 4/17). Neuroscience student, University of Minnesota, MN

#### **FORMER PHYSICAL THERAPY STUDENTS**

1. **Natalie Amundsen**, MS in Physical Therapy, College of St. Catherine, MN (12/95 to 6/98). Physical Therapist, Mills Health Center, CA
2. **Kristopher Balgaard**, DPT in Physical Therapy, University of Minnesota (1/01 to 7/02). Physical Therapist/Site Lead, Viverant, MN
3. **Brenda Becker**, MS in Physical Therapy, College of St. Catherine, MN (12/95 to 6/98)
4. **Mike Carey**, DPT in Physical Therapy, University of Minnesota (1/01 to 7/02). Physical Therapist, In Motion Physical Therapy & Fitness, MN
5. **Katherine Chromy**, DPT in Physical Therapy, University of Minnesota (1/01 to 7/02). Physical Therapist, Anoka/Hennepin School District, MN
6. **Jeremiah Hales**, MS in Physical Therapy, University of Minnesota (9/98 to 12/00). Physical Therapist, M-Power Physical Therapy, MN
7. **Pete Larson**, MS in Physical Therapy, University of Minnesota (9/98 to 12/00), Physical Therapist, MN
8. **Sonja Lukas (Day)**, DPT in Physical Therapy, University of Minnesota (2/03 to 7/04). Physical Therapist, Courage Center, Golden Valley, MN
9. **Laury Martini-Clymer**, MS in Physical Therapy, College of St. Catherine, MN (12/95 to 6/98)
10. **Erika Sandell**, DPT in Physical Therapy, University of Minnesota (2/03 to 7/04). Physical Therapist, Institute for Athletic Medicine, MN
11. **Kimberly Scharmer-Baumann**, MS in Physical Therapy, College of St. Catherine, MN (12/95 to 6/98)
12. **Margaret Tilman**, DPT in Physical Therapy, University of Minnesota (2/03 to 7/04). Physical Therapist, OSI Physical Therapy, MN

#### **FORMER PHYSIOLOGY STUDENTS**

1. **Jason Foss**, IBP rotation in Physiology (9/09 to 12/10)

#### **CURRENT UNDERGRADUATE STUDENTS AND VOLUNTEERS**

1. **Varun Agarwal**, Volunteer (12/18 to present)
2. **Kylea Barnes**, Volunteer (9/18 to present)
3. **Sydney Crims**, Volunteer (12/18 to present)
4. **Dannyelle Donahue**, Volunteer (8/18 to present)
5. **Kendall Emfield**, Volunteer (5/18 to present)
6. **Mahdi Hurreh**, Volunteer (9/17 to present)
7. **Chloe Johnson**, Volunteer (5/16 to present)
8. **Nick Karlovich**, Volunteer (9/18 to present)
9. **Savannah Martinson**, Volunteer (6/19 to present)
10. **Alexa Muylaert**, Volunteer (12/18 to present)
11. **Kishan Patel**, Volunteer (9/18 to present)
12. **Claire Thomas**, Volunteer (8/17 to present)
13. **Nichole Torgerson**, Volunteer (9/17 to present)
14. **Maia Warner**, Volunteer (7/19 to present)
15. **Rachel Wilharm**, Volunteer (9/18 to present)
16. **Emma Wilson**, Volunteer (9/18 to present)

#### **FORMER UNDERGRADUATE STUDENTS**

1. **Marina Abramovich**, Honors Thesis Project in Physio/ogy (8/98 to 3/99)

2. **Kymberly Adams**, Undergraduate in Electrical Engineering (4/93 to 7/93)
3. **Neil Aggarwal**, Summer Undergraduate Research Program in Science and Engineering via the National Science Foundation (6/98 to 8/98)
4. **Amber Aho**, Volunteer (5/03 to 8/03)
5. **Nadia Altaf**, Undergraduate scholar in the President's Distinguished Faculty Mentor Program (9/97 to 6/98)
6. **Brady Anderson**, Volunteer (1/15 to 6/16)
7. **Danielle Anderson**, Volunteer (8/14 to 1/15)
8. **Perico Noel Cruz Arcedo**, Research Explorations Program, Continuing Education and Extension, University of Minnesota (10/92 to 7/93)
9. **Verna Arcedo**, Research Explorations Program, Continuing Education and Extension, University of Minnesota (6/94 to 9/94)
10. **Gregory D. Ariff**, Summer Fellowship in Biomedical Engineering, Biomedical Engineering Center, University of Minnesota (6/97 to 8/97)
11. **Gunnar Askegaard**, Volunteer (9/14 to 5/15)
12. **Jeremiah Atkinson**, Volunteer (5/13 to 8/13)
13. **Dan Balto**, Volunteer/Undergraduate Research Opportunities Program/Directed research (6/10 to 6/11)
14. **Lukas Baner**, Volunteer (11/15 to 5/16)
15. **Jennifer Bangsund**, Research Experiences for Undergraduates via the National Science Foundation (6/95 to 9/95)
16. **Mariel Barcelos**, Volunteer (10/08 to 5/09)
17. **Aaron Barlow**, Volunteer (1/09 to 10/09); Directed research (5/10 to 8/10)
18. **Alex Barstad**, Volunteer (2/11 to 9/11)
19. **Kasia Bartczak**, Volunteer (2007-8)
20. **Ashley Bartlett**, Directed research, Technology (2007-8)
21. **Katie Batman**, Volunteer (2/14 to 1/15)
22. **Adam Beck**, Volunteer (4/13 to 1/14)
23. **Nick Beck**, Directed research in Biomedical Engineering (1/01 to 5/01)
24. **Grant Beckstrand**, Directed research in Biomedical Engineering (1/02 to 5/02)
25. **Alex Beebout**, Volunteer/Directed research (10/10 to 9/11)
26. **Jason Berg**, Volunteer (5/18 to 5/19)
27. **Stephanie Bersie**, Volunteer (5/13 to 5/15)
28. **Mark Bluemke**, Volunteer (11/05 to 5/06, 9/06 to 5/07)
29. **Vyvian Borse**, Volunteer (5/16 to 8/16)
30. **Hana Boudlali**, Volunteer (1/15 to 9/15)
31. **Tori Boughton**, Directed research in Physiology (5/05 to 8/05)
32. **Karen Broady**, Directed research in Biomedical Engineering (9/00 to 12/00)
33. **Erica Brooks**, Life Sciences Summer Undergraduate Research Program (6/98 to 8/98)
34. **Tara Buhl**, Advanced admission student, University of Minnesota School of Medicine (9/91 to 9/93)
35. **Angela Burgess**, Volunteer (2/17 to 9/17)
36. **Andrew Bursaw**, Directed research in Physiology (9/01 to 12/01)
37. **Theresa Bushman**, Volunteer (5/16 to 11/16)
38. **Michael Caldwell**, Honors Thesis Project in Physiology, Research assistant (7/97 to 3/99)
39. **Stephanie Caldwell**, Volunteer (10/12 to 12/12)

40. **Stuart Campbell**, Biomedical Engineering Life Sciences Summer Undergraduate Research Program (6/04 to 8/04)
41. **Khoa Cao**, Volunteer (2/13 to 6/14)
42. **Gail Carlson**, Volunteer (6/97 to 6/99)
43. **Nathan Carlson**, Research Explorations Program, Continuing Education and Extension, University of Minnesota (3/96 to 9/96)
44. **Elizabeth Carroll**, Honors Thesis Project in Physiology, Volunteer (7/97 to 3/99)
45. **Rachel Carson**, Directed research in Biology (11/04 to 8/05)
46. **Leilani Castleman**, Life Sciences Summer Undergraduate Research Program (6/02 to 8/02)
47. **Santiago Charry**, Volunteer (5/16 to 8/16)
48. **Geoffrey Cherucheril**, Volunteer (12/06 to 2/07, 2/08 to 5/09)
49. **Jennifer Chmura**, Volunteer (8/13 to 2/14, 6/14 to 6/16)
50. **Sung Jun “Paul” Cho**, Volunteer (10/15 to 5/18)
51. **David Choi**, Directed research, Undergraduate Research Opportunity Award recipient (2/03 to 4/04)
52. **Matthew Chu**, Life Sciences Summer Undergraduate Research Program (6/00 to 8/01), Johns Hopkins Medical School
53. **Ioana Ciuta**, Volunteer (11/13 to 6/14)
54. **Madison Clague**, Volunteer (5/15 to 9/15, 5/17 to 8/17)
55. **Ellie Clark**, Volunteer (11/13 to 6/14)
56. **Lynn Clark**, Directed research (Spring 2008)
57. **Ryan Clark**, Directed research (9/10 to 5/11)
58. **Amanda Claseman**, Volunteer (12/13 to 6/14)
59. **Chris Cobar**, Volunteer (11/14 to 5/14)
60. **Dayna Cohen**, Volunteer (10/13 to 2/14)
61. **Jerfiz Constanzo**, Life Sciences Summer Undergraduate Research Program (6/09 to 8/09)
62. **Ben Cooper**, Volunteer (2/11 to 5/11)
63. **Ryan Corcoran**, Directed research in Biology/Volunteer (2/05 to 1/08)
64. **Hailey Corrigan**, Volunteer (5/14 to 1/15)
65. **Jodi Deleski**, Volunteer (5/99 to 6/00)
66. **Erica Delin**, Volunteer (2/05 to 5/07)
67. **Tristan Dockendorf**, Volunteer, Undergraduate Research Opportunities Program (1/09 to 10/09)
68. **Kristin Donley**, Volunteer (9/02 to 8/03), Physical Therapy program, University of Minnesota
69. **Alec Donohue**, Volunteer (9/14 to 12/15)
70. **Peter Downie**, Volunteer (6/13 to 8/13)
71. **Rachel Drake**, Volunteer (5/12 to 6/14)
72. **Sherwin Duke**, Biomedical Engineering Undergraduate Summer Fellow (6/99 to 8/99)
73. **Mitch Dyrdahl**, Directed research (2/03 to 6/04)
74. **Tommica Edwards**, Undergraduate scholar in the President’s Distinguished Faculty Mentor Program (9/97 to 6/98)
75. **Alex Eldredge**, Volunteer (9/10 to 7/12)
76. **Katy Empanger**, Volunteer (5/12 to 8/15)
77. **Kristen A. Engelhardt**, Life Sciences Summer Undergraduate Research Program (6/92 to 8/92)
78. **Kyle Erickson**, Volunteer (6/11 to 9/11)

79. **Justin Esterberg**, Research Explorations Program, Continuing Education and Extension, University of Minnesota (7/93 to 10/93)
80. **Sarah Ezzat**, Volunteer, Undergraduate Research Opportunities Program (2/06 to 5/07)
81. **Jon Falkenberg**, Research Explorations Program, Continuing Education and Extension, University of Minnesota (6/94 to 7/95)
82. **Gia Fedo**, Volunteer (10/08 to 10/09)
83. **Rachel (Bersie) Feliciano**, Volunteer (5/14 to 8/16)
84. **Kris Felsman**, Volunteer (6/97 to 6/98)
85. **Jessica Felton**, Volunteer (1/09 to 5/09)
86. **Emily Fiala**, Volunteer (2/17 to 8/18)
87. **Kristi Field**, Research Explorations Program, Continuing Education and Extension, University of Minnesota (3/94 to 11/95)
88. **Darryl Finkton**, Life Sciences Summer Undergraduate Research Program (5/07 to 8/07)
89. **Mary Finta**, Volunteer (10/13 to 5/15)
90. **Emily Fitch**, Volunteer (5/10 to 8/12)
91. **James Fleming**, Volunteer (4/13 to 5/14)
92. **Patrick Fones**, Volunteer (8/08 to 12/08)
93. **Bret Fox**, Volunteer (5/12 to 10/13)
94. **Boutheina Fradj**, Directed research (9/14 to 5/15)
95. **Brad Fredrickson**, Volunteer (9/14 to 12/15)
96. **Andy Freeman**, Volunteer in Biomedical Engineering (2/02 to 5/02)
97. **Ally Fuher**, Volunteer/Student employee (5/14 to 6/17)
98. **Darren Galligan**, Life Sciences Summer Undergraduate Research Program in Biomedical Engineering (6/03 to 8/03)
99. **Dionna Gamble**, Life Sciences Summer Undergraduate Research Program (6/11 to 8/11)
100. **Grant Gangeness**, Volunteer/Undergraduate Research Opportunities Program (5/13 to 8/14)
101. **Josh Gangl**, Volunteer (11/16 to )
102. **Chelsie GawneMark**, Volunteer (8/13 to 6/14)
103. **Erin Ge**, Directed research (6/06 to 8/06)
104. **Tara Gengenbach**, Research Explorations Program, Continuing Education and Extension, University of Minnesota (9/95 to 12/96)
105. **Scott Gershan**, Volunteer (9/05 to 5/06)
106. **Jeff B. Geske**, Directed research in Physiology (1/02 to 5/02), Mayo Medical School, MN
107. **Megan Ghai**, Volunteer (9/08 to 12/11)
108. **Odalys Gonzalez-Rodriguez**, Life Sciences Summer Undergraduate Research Program (6/06 to 8/06)
109. **William Goodson**, Research Experiences for Undergraduates via the National Science Foundation (6/94 to 8/94)
110. **David Grabowski**, Honors Thesis Project in Biochemistry (7/97 to 6/98)
111. **Kevin Graden**, Volunteer (8/09 to 2/11)
112. **Tony Grandelis**, Volunteer (3/09 to 5/09)
113. **Michael Greene**, Volunteer (5/16 to )
114. **Emma Greibenow**, Volunteer (10/15 to 11/16)
115. **Melissa Groen**, Directed research (12/08 to 8/09)
116. **Amelia Gudex**, Directed research (8/16 to 2/17)
117. **Erik Gudmundson**, Volunteer (2008)
118. **Adam Gullickson**, Directed research (2/03 to 6/03)



119. **Jake Gustafson**, Volunteer (5/14 to 12/14)
120. **Annie Haakenstad**, Volunteer (10/15 to 8/16)
121. **Amy Handlogten**, Volunteer/URS (9/11 to 5/12)
122. **Victoria Harp**, SEED program, Center for Interfacial Engineering via the National Science Foundation (6/94 to 8/94)
123. **Sam Harpell**, Volunteer (10/14 to 9/15)
124. **Jack Hartmann**, Directed research (1/16 to 2/17)
125. **Kevin Hartoyo**, Volunteer (9/15 to 2/17)
126. **Moe Hatab**, CHE Research Training Program (5/10 to 6/12)
127. **Josh Havel**, Directed research (1/13 to 5/13)
128. **Jennifer Heidmann**, Research Explorations Program, Continuing Education and Extension, University of Minnesota (1/94 to 8/94)
129. **Salma Helal**, Directed research in Biological Sciences (1/07 to 9/07)
130. **Andrew Held**, Undergraduate research assistant in the Center for Interfacial Engineering via the National Science Foundation (4/92 to 8/93)
131. **Alyssa Hennen**, Volunteer (5/12 to 10/12)
132. **Gabriel Hernandez**, Life Sciences Summer Undergraduate Research Program (6/14 to 8/14)
133. **Mackenzie Herzig**, Volunteer (11/14 to 5/16)
134. **Danielle Hesprich**, Volunteer (9/05 to 8/06)
135. **Erica Hjelle**, Casual/temp employee (6/09 to 8/09)
136. **Mara Hjelle**, Casual/temp employee (4/12 to 10/12)
137. **Thuy Hoang**, Volunteer (2/17 to 6/17)
138. **Matt Hoffman**, Directed research (7/08 to 5/09)
139. **Shawn Hong**, Volunteer (11/13 to 12/14)
140. **Aishania Hopkins**, Senior thesis for summa honors (9/96 to )
141. **Christina Horn**, Life Sciences Summer Undergraduate Research Program (6/02 to 8/02)
142. **Dan Hosker**, Volunteer; Physiology honors project (6/09 to 8/10)
143. **Christopher Howard**, Directed research in Biomedical Engineering, Volunteer (1/03 to 6/05)
144. **Emily Hoyer**, Volunteer (6/12 to 8/12)
145. **Noora Hussain**, Volunteer (9/12 to )
146. **Devon Hutton**, Volunteer (5/09 to 8/10)
147. **Hanna Iaizzo**, Casual/temp employee (6/09 to 8/09)
148. **Jenna Iaizzo**, Directed research in Physiology/Volunteer (5/05 to 8/05, 6/06 to 8/06)
149. **Yoko Ishida**, Volunteer (9/12 to 10/13)
150. **Jihan Jacobs**, Directed research in Physiology/Biology (10/04 to 5/06)
151. **Christine Jauregui**, Research Explorations Program, Continuing Education and Extension, University of Minnesota (7/95 to 9/95)
152. **Dawn Jiang**, Volunteer (12/12 to 5/13)
153. **Brooks Johnson**, Volunteer in Physiology (6/95 to 9/98)
154. **Graham Johnson**, Volunteer (5/16 to 7/17)
155. **Karl Johnson**, Honors thesis in Physiology (9/05 to 5/06)
156. **Lisa Johnson**, Junior Research Project in Physics (1/02 to 5/02)
157. **Zach Juveli**, Volunteer (7/08 to 12/08)
158. **David Kalb**, Life Sciences Summer Undergraduate Research Program (6/93 to 8/93)
159. **Amy Kaleita**, Summer Fellowships in Biomedical Engineering, Biomedical Engineering Center, University of Minnesota (6/95 to 8/95)
160. **Christina Kang**, Directed research (9/03 to 1/04)

161. **Cory Kasprzak**, Volunteer (6/10 to 12/10)
162. **Megan Katopodis**, Casual/temp employee (5/17 to 7/17)
163. **Daniel Kehler**, Volunteer (10/06 to 4/07)
164. **Jackie Kehler**, Volunteer (6/03 to 8/03)
165. **Alexander (AJ) Kellogg**, Volunteer (5/12 to 10/12)
166. **Brenna Kelly**, Post-baccalaureate volunteer (9/17 to 5/18)
167. **Kyrsten Kelley**, Volunteer/Undergraduate Research Opportunities Program (CBS) (2005-8)
168. **Hayden Kelly**, Volunteer (12/11 to 5/12)
169. **Jason Kelly**, Life Sciences Summer Undergraduate Research Program (5/15 to 8/15)
170. **Todd Kerkow**, Undergraduate research assistant in the Center for Interfacial Engineering via the National Science Foundation. (12/93 to 9/95)
171. **Michael Kern**, Volunteer (9/05 to 5/06)
172. **Alyssa Kessel**, Volunteer (7/12 to 5/13)
173. **Mira Khatib**, Volunteer (5/13 to 8/13)
174. **Tarek Khatib**, Post-baccalaureate volunteer (1/18 to 12/18)
175. **Martin Khoury**, Volunteer (9/15 to 6/16)
176. **Sheena Kiaei**, Volunteer (9/16 to 7/17)
177. **Jennifer Kim**, Volunteer (5/15 to 8/15)
178. **Jennifer Kim**, Volunteer (5/16 to 7/17)
179. **Gayla King**, Volunteer (8/99 to 12/99)
180. **Steve Kiviahde**, Directed research (9/08 to 5/09)
181. **Will Kivlin**, Volunteer (1/15 to 9/15)
182. **Katherine G. Koff**, Research Explorations Program, Continuing Education and Extension, University of Minnesota (1/96 to 4/99)
183. **Emily Kollenbroich**, Volunteer (8/16 to 5/17)
184. **John Korkko**, Volunteer (5/09 to 10/09)
185. **Becky Kortum**, Volunteer (8/13 to 6/14)
186. **Mariya Kovaleva**, Volunteer (9/08 to 11/08, 2/09 to 5/09, 10/09 to 5/10)
187. **Konstantin Kravcheuko**, Directed research (10/10 to 6/11)
188. **Beth Kregel**, Volunteer (9/10 to 5/12)
189. **Traci Kress**, Volunteer, Casual/temp employee (8/12 to 12/12)
190. **Kevin Kriege**, Volunteer (5/13 to 6/16)
191. **Lori Kruse**, Biological Sciences Alumni Society mentor Program, Volunteer (1/96 to 6/98)
192. **Roby Kuderko**, Volunteer (1/12 to 12/12)
193. **Daniel Kuivinen**, Volunteer (2/17 to 9/17)
194. **Elizabeth Laakso**, LHI scholar (5/15 to 9/15)
195. **Dan Lackas**, Undergraduate research assistant in the Center for Interfacial Engineering via the NSF (6/93 to 6/94, 9/94 to 7/96); Research Experiences for Undergraduates via the NSF (6/94 to 9/94)
196. **Joe Lai**, Volunteer (1/09 to 8/09)
197. **Maria LaNasa**, Volunteer (7/09 to 12/10)
198. **Xiao-yu (Matt) Lao**, Research Experiences for Undergraduates via the NSF (6/94 to 8/94)
199. **Allison Larson**, Volunteer (6/11 to 8/13)
200. **Jessie Lasher**, Volunteer (6/08 to 8/08, 5/09 to 8/09)
201. **Juliet Laske**, Volunteer, Casual/temp employee (10/13 to 8/14)
202. **Tod Leaven**, Neuroscience, Life Sciences Summer Undergraduate Research Program (6/97 to 8/97)

203. **Mai Yer Lee**, Volunteer (9/11 to 2/14)
204. **Panyiag Lee**, Volunteer (12/08 to 8/09)
205. **Keith Leland**, Undergraduate research assistant in the Center for Interfacial Engineering via the National Science Foundation (7/93 to )
206. **Ed LeMahieu**, Directed research in Physiology (1/00 to 12/00)
207. **Charles LeNeave**, Volunteer (1/16 to 7/17)
208. **Elizabeth Lezama**, Life Sciences Summer Undergraduate Research Program (6/13 to 8/13, 6/14 to 8/14)
209. **Jason Liao**, Volunteer (10/14 to 1/15)
210. **Kevin Liao**, Volunteer (7/10 to 9/10)
211. **Annette Lindblom**, Research Experiences for Undergraduates via the NSF (6/97 to 8/97)
212. **Xiaoyin Ling**, Volunteer (2/18 to 12/18)
213. **Cindy Liu**, Directed research for honors project in Physiology (9/00 to 12/00)
214. **Meghan Longen**, Volunteer (1/18 to 8/18)
215. **Jim MacKenzie**, Volunteer, pre-med student at the University of Minnesota (7/95 to 9/95)
216. **Libby Magnuson**, Graphic art designer (6/07 to 9/07)
217. **Erin Mahre**, Casual/temp employee (5/17 to 8/17)
218. **Claire Manlove**, Volunteer (11/12 to 5/15)
219. **Aamir Mansoor**, Volunteer (2006-7)
220. **Jade Marchiniak**, Volunteer (1/12 to 5/12)
221. **Irmarie Marrero-Marrero**, Life Sciences Summer Undergraduate Research Program (6/12 to 8/12)
222. **Phil Matta**, Directed research/Volunteer (12/07 to 10/09)
223. **Kari Mattison**, Casual/temp employee (5/15 to 8/15)
224. **Frances Maybach**, Directed research/Volunteer (1/05 to 12/05, 6/06 to 1/07)
225. **Sheena Mbachu**, Volunteer (2/10 to 12/10)
226. **Anna McCormick**, Directed research (10/05 to 1/07)
227. **Gannon McGrath**, Volunteer (8/12 to 8/13, 6/14 to 1/15)
228. **Brendan McKnight**, Volunteer (1/06 to 1/07)
229. **Nathan McLean**, Directed research (2/03 to 6/03)
230. **Melanie Menk**, Volunteer (1/15 to 1/18)
231. **Nate Menninga**, Casual/temp employee (5/14 to 8/14)
232. **James Mika**, Undergraduate Research Opportunity Program (2/05 to 6/05)
233. **Jesse Miller**, Volunteer (2/03 to 6/03)
234. **Laura Miller**, Volunteer and Honors Project in Physiology (1/01 to 12/01, 7/03 to 5/05), School of Public Health, University of Minnesota (7/05)
235. **Nana Mitsuishi**, Volunteer (11/14 to 7/17)
236. **Jacquelyn Mohn**, Senior honors project (2007-8)
237. **Allison Mumbleau**, Volunteer (6/04 to 8/04)
238. **Semal Musleh**, Volunteer (10/14 to )
239. **Nancy Nacker**, Volunteer (9/97 to 6/98)
240. **Max Nagarajan**, Volunteer/URS (10/11 to 1/12)
241. **Caroline Nam**, Biomedical Engineering Undergraduate Summer Fellow (6/99 to 8/99)
242. **Cherie Nau**, Volunteer (9/95 to 3/96)
243. **Denise Nelson**, Volunteer/Directed research (9/11 to 5/12)
244. **Mitch Nelson**, Volunteer (1/10 to 5/12)
245. **Nicole Neumann**, Volunteer (8/13 to 12/14)

246. **Krista Neururer-Rothstein**, Volunteer/Directed research (1/10 to 8/11)
247. **Sydney Newton**, Volunteer (5/15 to 12/18)
248. **Mary Nguyen**, President's Distinguished Faculty Mentor Program; Undergraduate Research Opportunity Award (1/01 to )
249. **Nicki Nguyen**, President's Distinguished Faculty Mentor Program (10/95 to 12/99)
250. **Lesla Nord**, Volunteer, Casual/temp employee (8/10 to 8/12)
251. **Edna Nore**, Life Sciences Summer Undergraduate Research Program (6/03 to 8/03)
252. **Meagan Nowariak**, LHI Scholar (6/17 to 8/17)
253. **Maureen O'Connor**, Volunteer (2008)
254. **Naomi Ollila**, Volunteer (12/13 to 8/14)
255. **Steve Oommen**, Directed research, Undergraduate Research Opportunity Award (2/03 to 5/04)
256. **Lev Ostrer**, Volunteer (9/11 to 5/12)
257. **Kate Overgaard**, Volunteer (9/09 to 12/09)
258. **Maria Pagnetta**, Professional Learning Experience Program, Biological Sciences, University of Minnesota (6/94 to 8/94)
259. **Drew Paradis**, Volunteer (1/13 to 5/13)
260. **Nia Patterson**, Life Sciences Summer Undergraduate Research Program (6/11 to 8/11)
261. **Scott Pearson**, Volunteer (1/11 to 5/12)
262. **Michelle Perry**, Life Sciences Summer Undergraduate Research Program (5/07 to 8/07)
263. **Lee Peters**, Volunteer (9/10 to 8/11)
264. **Brent Peterson**, Volunteer (10/11 to 12/11)
265. **Justin Peterson**, Volunteer (5/06 to 1/08)
266. **Emily Pfieffer**, Volunteer (9/16 to 9/18)
267. **Catherine Pham**, Pre-med Scholar (10/03 to 8/05)
268. **Nicholas Plachinski**, Volunteer (5/18 to 12/18)
269. **Dmitrii Pokhil**, Volunteer (6/11 to 12/11)
270. **Tracy Powell**, Volunteer (1/07 to 8/08)
271. **Garrett Prah**, Volunteer (7/12 to 5/13)
272. **Conner Prasky**, Volunteer (10/16 to 7/17)
273. **Dawn Qiu**, Directed research (12/05 to 5/07)
274. **Amelia Raether**, Volunteer (6/10 to 8/10)
275. **Henry Raether**, Volunteer (6/13 to 8/13)
276. **Starr Ramirez**, University of Minnesota Health Sciences Minority Program: High School Research Apprentice Program (6/97 to 8/97)
277. **Dylan Redden**, Volunteer (12/13 to 8/14)
278. **Elizabeth Reilly**, Biomedical Engineering Undergraduate Summer Fellow (6/00 to 8/00)
279. **Dannah Reiter**, Volunteer (2/14 to 8/15)
280. **Jessica Reynertson**, Volunteer (1/09 to 9/09)
281. **Aaron Richter**, Volunteer (11/13 to 9/15)
282. **Casey Rieck**, Volunteer (10/14 to 8/16)
283. **Tyler Riedinger**, Volunteer (11/13 to 6/14)
284. **Mathew Robertson**, Summer Research Programs via Goucher University (6/03 to 8/03)
285. **Laura Rogers**, Volunteer (10/14 to 9/15)
286. **Alison Rolandelli**, Volunteer (5/15 to 9/15)
287. **Paul Rolfes**, Volunteer, Casual/temp employee (6/11 to 8/11)
288. **Jocelyn Rowe**, Biology Colloquium Course, volunteer (12/98 to 6/99)
289. **Andrew Roy**, Volunteer (5/13 to 8/13)

290. **Sam Rush**, Volunteer, National High School Science Fair Competitions (6/94 to 9/97)
291. **Emily Sakamoto**, Volunteer (5/13 to 7/13)
292. **Shireen Sakizadeh**, Directed research in Physiology (9/01 to 12/01)
293. **Lahiru Samarsinghe**, Volunteer (5/16 to 7/17)
294. **Marit Sanders**, Volunteer (1/07 to 9/07)
295. **Kristy Schaefer**, Directed research in Physiology (1/02 to 5/02)
296. **Bill Schertzing**, Volunteer (9/07 to 12/10)
297. **Bryant Schmitz**, Volunteer (11/12 to 5/13)
298. **Michael Schnaus**, Volunteer (6/09 to 5/10)
299. **Nate Schneider**, Volunteer (1/11 to 6/11)
300. **Keriann Schulkers**, Volunteer (10/06 to 4/07)
301. **Katrina Schweiker**, Junior Research Project in Physics (1/02 to 5/02)
302. **Ashley Scott**, Life Sciences Summer Undergraduate Research Program (6/13 to 8/13)
303. **Jamilisse Segarra**, Life Sciences Summer Undergraduate Research Program (5/15 to 8/15)
304. **Maria Seewald**, Volunteer (3/12 to 4/12)
305. **Kelly Seifert**, Research Explorations Program, Continuing Education and Extension, University of Minnesota from Wellesley College (6/96 to 9/96)
306. **Neda Shahghasemi**, Directed research in Biomedical Engineering (5/04 to 5/05)
307. **Salma Shaker**, Volunteer (5/07 to 6/09)
308. **Olivia Shepler**, Volunteer (5/15 to 8/15; 5/16 to 8/16)
309. **Margaret Shevik**, Volunteer (11/12 to 10/13)
310. **Nina Sigg**, Volunteer (3/13 to 6/13)
311. **Laura Skadsberg**, Undergraduate Research Opportunity Award (1/04 to )
312. **Laura Skarie**, Volunteer, University of Minnesota (9/98 to 4/99)
313. **Kaley Smith**, Volunteer (2009)
314. **Jaime Smith**, Volunteer (1/06 to 5/06)
315. **Sarah Sneider**, Volunteer (8/05 to 12/05)
316. **Oliver Sogard**, Volunteer (4/14 to 1/15)
317. **Nancy Sokkary**, Magna cum laude paper, Physiology (1/02 to )
318. **Tanya Solovey**, Undergraduate Research Opportunity Award, pre-med student at University of Minnesota (5/94 to 7/96)
319. **Danielle Sorensen**, Volunteer (1/18 to 5/18)
320. **Mario Soto**, Life Sciences Summer Undergraduate Research Program (6/16 to 8/16)
321. **Zach Sperry**, Volunteer (9/10 to 12/11)
322. **Natasha Srb**, Volunteer (3/99 to 10/99)
323. **Jenna Stangland**, Volunteer in CBS (9/06 to 5/07)
324. **Jake Starsiak**, Volunteer (5/13 to 12/14)
325. **Chelsea Steinborn**, Volunteer (9/07 to 4/09)
326. **Zak Stelter**, Volunteer (9/10 to 12/10)
327. **Justine Sternke**, Volunteer (11/13 to 2/14)
328. **Luis Cesar Suarez-Rodriguez**, Life Sciences Summer Undergraduate Research Program (6/06 to 8/06)
329. **Sean Sullivan**, Biomedical Engineering Undergraduate Summer Fellow (6/01 to 8/01)
330. **Cassandra Sundaram**, Volunteer (3/12 to 12/14)
331. **Kimberly Swanson**, Volunteer, nursing student, University of Minnesota (7/94 to 12/94)
332. **Geoff Swisher**, Volunteer (1/13 to 5/13)
333. **Emily Syverud**, LHI scholar (5/15 to 8/15)

- 334. **Nick Tassoni**, Volunteer (9/12 to 5/13)
- 335. **Ryan Taylor**, Volunteer (5/10 to 5/11)
- 336. **Melissa (Toolie) Tetzner**, Volunteer (6/09 to 8/09)
- 337. **Rohan Thakur**, Volunteer (6/18 to 5/18)
- 338. **Kelly Thao**, Volunteer (5/12 to 9/15)
- 339. **Sara Torgerson**, Life Sciences Summer Undergraduate Research Program (6/01 to 8/01)
- 340. **Katia Y. Torres Román**, Life Sciences Summer Undergraduate Research Program (6/12 to 8/12)
- 341. **Peter Toy**, Volunteer (6/10 to 8/13)
- 342. **Jack Trebelhorn**, Volunteer (9/10 to 6/12)
- 343. **Ben Troness**, Volunteer (8/13 to 8/14)
- 344. **Nolan Turner**, Volunteer (5/09 to 5/10)
- 345. **Joanna Ulmen**, Casual/temp employee (2008-09)
- 346. **John Uphoff**, Volunteer (11/09 to 9/11)
- 347. **Kristen Upson**, Directed research in Physiology (12/00 to 12/01)
- 348. **Uzma Usmani**, Life Sciences Summer Undergraduate Research Program (6/09 to 8/09)
- 349. **Mike Van Heel**, Volunteer (3/13 to 12/14)
- 350. **Julia Van Luyk**, Volunteer (2/17 to 8/18)
- 351. **Sukanya Varadharajan**, Volunteer (11/09 to 5/10)
- 352. **Kari Varichak**, Directed research in Biomedical Engineering (9/00 to 12/00)
- 353. **Matt Varner**, Directed research (1/04 to 5/05)
- 354. **Aileen Villanueva**, Undergraduate scholar in the President's Distinguished Faculty Mentor Program (10/94 to 6/95)
- 355. **Sarah Vincent**, Directed research in Biomedical Engineering, Biomedical Engineering Undergraduate Summer Fellow (1/01 to 9/01)
- 356. **Chelsea Wallace**, Directed research (9/03 to 6/05)
- 357. **Lisa Weeks**, Work Study (10/12 to 6/14)
- 358. **Josh Weinberger**, Life Sciences Summer Undergraduate Research Program (7/08 to )
- 359. **Melissa White**, Volunteer (10/11 to 2/14)
- 360. **Mark Wieland**, Life Sciences Summer Undergraduate Research Program (6/98 to 8/98)
- 361. **Erin Williams**, Research Explorations Program, Continuing Education and Extension, University of Minnesota (6/95 to 1/96)
- 362. **Jonathan Williams**, Volunteer (10/16 to 7/17)
- 363. **Marta Williams**, LHI Scholar (6/17 to 8/17)
- 364. **Anna Windfeldt**, Directed research in Biology (9/02 to 12/02)
- 365. **Simon Wing**, Volunteer (6/99 to 6/00)
- 366. **Steve Wisniewski**, Biological Sciences Alumni Society Mentor Program, Undergraduate Research Opportunity Program (1/95 to 9/96)
- 367. **Kylie Wittl**, Volunteer (5/14 to 12/14)
- 368. **Jade Wulff**, Volunteer (3/04 to 6/05)
- 369. **Nadine Yacoub**, Volunteer/Directed research (9/11 to 10/13)
- 370. **Mai Der Yang**, LHI Scholar (5/14 to 9/14), Volunteer (5/15 to 9/15)
- 371. **Pang Dra Yang**, Undergraduate scholar in the President's Distinguished Faculty Mentor Program (9/96 to 6/97)
- 372. **Melanie Yates**, Volunteer (5/15 to 9/15)
- 373. **KC (Kojo) Yeboa**, Life Sciences Summer Undergraduate Research Program (6/10 to 8/10)
- 374. **Jon Yoon**, Volunteer (5/15 to 8/15)

- 375. **Jackie Youtsos**, Honors Thesis Project in Physiology, Undergraduate Research Opportunities Program (3/04 to 6/05)
- 376. **Shawn Zani**, Volunteer (9/09 to 5/11)
- 377. **Maria Zauner**, Volunteer/Life Sciences Summer Undergraduate Research Program, Undergraduate Research Opportunities Program (6/10 to 5/12)
- 378. **JingJing Zhu**, LHI Scholar (6/16 to 8/16)
- 379. **Patrick Zielie**, Pre-med undergraduate student, summa thesis (4/93 to 8/93)
- 380. **Kim Zillig**, Directed research in Biomedical Engineering (1/04 to 6/04)
- 381. **Jenna Zimmerman**, Volunteer (1/10 to 6/14)
- 382. **Shannon Zhou**, Volunteer (9/16 to 7/17)
- 383. **Fu Zurovac**, Directed research (9/03 to 12/05)

#### **CURRENT HIGH SCHOOL STUDENTS**

None

#### **FORMER HIGH SCHOOL STUDENTS**

- 1. **Bobby Gelly**, Volunteer, Mahtomedi High School (6/13 to 8/13)
- 2. **Daniel Geoffrion**, ISEF program via Breck High School (5/05 to 8/05)
- 3. **Nia Jones**, University of Minnesota Health Sciences Minority Program: High School Research Apprentice Program (6/96 to 9/96)
- 4. **Keshav Kohli**, Volunteer (7/08 to 8/09)
- 5. **Sabina Kumar**, Volunteer (5/09 to 5/10)
- 6. **Aamir Mansoor**, Volunteer (2/06 to 5/06)
- 7. **Andrew McCullough**, ISEF program via Breck High School (5/05 to 8/05)
- 8. **Andrew Nelson**, Volunteer via St. Cloud Apollo High School (6/06 to 8/06)
- 9. **Arsalan Radmehr**, Volunteer (Wayzata High School) (6/11 to 12/11)
- 10. **Vidur Sharma**, Volunteer, Eagan High School (6/07 to 8/07, 7/08 to 8/09)
- 11. **Noah Smith**, St. Paul Academy (5/05 to 6/05)
- 12. **Zach Soule**, Volunteer, Blaine High School (7/08 to 8/08)
- 13. **Sally Swanson**, Volunteer, St. Paul Academy (5/05 to 6/05)
- 14. **Mai Der Yang**, LHI Summer Scholar (6/14 to 8/14)

#### **FORMER INTERNATIONAL STUDENTS**

- 1. **Gunter Apelt**, Practicum in Biomedical Engineering from the Fachhochschule Anhalt, Köthen, Germany (5/96 to 7/96)
- 2. **Eva Geissler**, Physical therapist from Germany (4/05)
- 3. **Holger Lerche, MD**, Medical student from the University of Munich, Germany (6/93 to 7/93)
- 4. **Carl Meissner**, Intern from Wohlsdorf, Germany (2003)
- 5. **Karsten Meissner**, Practicum in Biomedical Engineering from the Fachhochschule Anhalt, Köthen, Germany (7/96 to 10/96)
- 6. **Susanne Ruff**, Graduate student in Nutritional Sciences from the Technical University of Munich, Germany (5/98 to )
- 7. **Andrea Sammler**, Graduate student in Nutritional Sciences from the Technical University of Munich, Germany (9/94 to 12/94)
- 8. **Maria Seewald**, Medical student from the University of Magdeburg, Germany (2/12 to 4/12)

#### **STUDENTS (Initiated programs and then considered other options)**

1. **Mark Hilse**, MS student in Biomedical Engineering, Plan B (1/99 to)
2. **Janice Kruse**, MS student in Biomedical Engineering, Plan B (2/08 to 5/08)
3. **Robert Schmitt**, MS student in Physiology (12/05 to 10/07)
4. **Ryan Scott**, MS student in College of Biological Sciences, Directed Research (1/07 to 8/08)
5. **Hua Sun**, Doctoral student in Biomedical Engineering, Medtronic, MN (1/07 to 6/08)
6. **Samira Tahvildari, MS**, Doctoral student in Biomedical Engineering (5/00 to 8/08)
7. **Meredith Thompson**, Doctoral student in Biomedical Engineering (10/07 to 9/08)

#### **STUDENTS (Member of thesis committees only)**

1. **Devesh Amatya**, Biomedical Engineering, PhD (passed prelim 12/05)
2. **Joseph Anderson**, Mechanical Engineering, MS granted 5/13
3. **Paul R. Barratt**, Mechanical Engineering, MS granted 5/99
4. **Kaysie L. Banton, MD**, Surgery, PhD (passed prelim 5/09)
5. **Diana Burns**, Biomedical Engineering, MS granted 1/95
6. **Ricky Chow**, Biomedical Engineering, MS granted 12/09
7. **Razvan Cornea**, Biochemistry, PhD (passed prelim 1/94)
8. **Kelsey Davis**, Mechanical Engineering, MS granted 12/17
9. **Lisa M. Durhman**, Biomedical Engineering, MS granted 8/99
10. **Michelle Fangmeier**, Mechanical Engineering, MS granted 10/02
11. **Juan Feng**, Biomedical Engineering, PhD granted 11/07
12. **Julia Feygin**, Biomedical Engineering, PhD granted 10/07
13. **Stefan Freeman**, Mechanical Engineering, MS granted 9/09
14. **Michael Eggen**, Mechanical Engineering, MS granted 12/05
15. **Vadim Gektin**, Mechanical Engineering, MS granted 12/93; PhD (passed prelim 5/96)
16. **Matthew Geeslin**, Mechanical Engineering, MS granted 12/03
17. **Jesse Geroy**, Mechanical Engineering, MS granted 8/07
18. **Adam Gladen**, Mechanical Engineering, MS granted 6/11
19. **Robert Griffin**, Biophysical Science, PhD granted 6/98
20. **Brent T. Harrold**, Mechanical Engineering, MS granted 12/98
21. **Jud Herrig**, Mechanical Engineering, MS granted 3/08
22. **Margaret A. Hartfel**, Mechanical Engineering, PhD granted 2/01
23. **Xiaoming He**, Mechanical Engineering, PhD granted 5/04
24. **Dillon Hodapp**, Mechanical Engineering, MS granted 12/09
25. **Bradley S. Karon**, Biochemistry, PhD granted 8/94
26. **Jason Kelly**, Mechanical Engineering, PhD candidate (2019 to present)
27. **Scott Kimmel**, Biomedical Engineering, MS granted 11/04
28. **James Krolnik**, MS-MDI (2018 to present)
29. **Brian Krueger**, Mechanical Engineering, MS granted 10/12
30. **John A. Krueger**, Biomedical Engineering, MS granted 9/94
31. **Po-Chih Lee**, Mechanical Engineering, PhD granted 5/19
32. **Jeffery Lind**, Mechanical Engineering, MS granted 4/14
33. **Chenguang Liu**, Biomedical Engineering, PhD granted 12/09
34. **Ryan Mach**, Mechanical Engineering, MS granted 12/04
35. **Michael S. Mata**, Mechanical Engineering, MS granted 5/07
36. **Brian T. McHenry**, Mechanical Engineering, MS granted 5/02
37. **Alexandra M. Naughton**, Aerospace Engineering, MS granted 5/98
38. **Josie Nelson**, Physical Therapy, MS granted 6/02



39. **Julia Neuman**, Mechanical Engineering, MS granted 12/07
40. **Duy Nguyen**, Biomedical Engineering, MS granted 12/04
41. **Brenda Ogle**, Biomedical Engineering, PhD granted 9/00
42. **Deb O'Reilly**, Physical Therapy, MS granted 6/02
43. **E. Michael Ostap**, Biochemistry, PhD granted 8/93
44. **Suku Pongshe**, Mechanical Engineering, MS granted 5/09
45. **A.J. Reis**, Biomedical Engineering, MS granted 6/97
46. **Chad Ritter**, Physical Therapy, MS granted 6/02
47. **Adam Rivard**, Mechanical Engineering, MS granted 5/04
48. **Cindy Satterness**, Biomedical Engineering, PhD (passed prelim 7/01)
49. **Diane Schebonski**, Mechanical Engineering, MS granted 5/13
50. **Robert Schulzetenberg**, Biomedical Engineering, MS granted 7/16
51. **Colin Sehnert**, Mechanical Engineering, MS granted 9/03
52. **Alexander Shrom**, Biomedical Informatics and Computational Biology, MS granted 5/19
53. **Allan Shuros**, Integrative Biology & Physiology, MS granted 12/11
54. **Jason Sprain**, Biomedical Engineering, MS granted 10/03
55. **Sachin Shah**, Biomedical Engineering, MS granted 7/13
56. **Tom Suszynski**, Biomedical Engineering, MD, PhD granted 8/12
57. **Kevin Thissen**, Mechanical Engineering, MS granted 4/09
58. **David Tkach**, Biological Sciences, MS granted 9/10
59. **Sang Tran**, Biomedical Engineering, MS granted 3/95
60. **Dawn Violette**, Physical Therapy, MS granted 6/02
61. **Rachel Weathers-Pawson**, Mechanical Engineering, PhD (passed prelim 2/01)
62. **Samuel Lee Will**, Mechanical Engineering, MS granted 12/05
63. **Elizabeth Wilson**, Biomedical Engineering, PhD Committee (2019 to 8/19)
64. **Terri Wright**, Biomedical Engineering, MS granted 10/01
65. **Jade Erin Wulff**, Biological Sciences, MS granted 7/07
66. **Long Yu**, Biomedical Engineering, PhD granted 11/16
67. **Zhaoye Zhou**, Biomedical Engineering, PhD (passed prelim 9/10)

## PUBLICATIONS

### ORIGINAL ARTICLES

1. Pozos RS, **Iaizzo PA**, Petry RW: Physiological action tremor of the ankle. *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology* 52:226-230, 1982. DOI: 10.1152/jappl.1982.52.1.226.
2. Iaizzo PA, Pozos RS: Exercise-induced amplitude modification of physiological action tremor of the ankle. *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology* 53:1164-1170, 1982. DOI: 10.1152/jappl.1982.53.5.1164.
3. Quinlan JG, Iaizzo PA, Gronert GA, Taylor SR: Use of dantrolene plus multiple pulses to detect stress-susceptible porcine muscle. *Journal of Applied Physiology* 60:1313-1320, 1986. DOI: 10.1152/jappl.1986.60.4.1313.
4. Iaizzo PA, Klein W, Lehmann-Horn F: Fura-2 detected myoplasmic calcium and its correlation with contracture force in skeletal muscle from normal and malignant hyperthermia susceptible pigs. *Pflügers Archive* 411:648-653, 1988. DOI: 10.1007/BF00580861.
5. Iaizzo PA: The effects of temperature on relaxation in frog skeletal muscle. *Pflügers Archive* 412:195-202, 1988. DOI: 10.1007/BF00583750.

6. Oakes SG, Iaizzo PA, Richelson E, Powis G: Histamine-induced intracellular free  $\text{Ca}^{++}$ , inositol phosphates and electrical changes in murine N1E-115 neuroblastoma cells. *Journal of Pharmacology and Experimental Therapeutics* 247:114-121, 1988. PMID: 3262737.
7. Quinlan JG, Iaizzo PA, Lambert EH, Gronert GA: Ankle dorsiflexor twitch properties in malignant hyperthermia. *Muscle & Nerve* 12:119-125, 1989. DOI 10.1002/mus.880120206.
8. Iaizzo PA, Lehmann-Horn F, Taylor SR, Gallant EM: Malignant hyperthermia: effects of halothane on the surface membrane. *Muscle & Nerve* 12:178-183, 1989. DOI: 10.1002/mus.880120303.
9. Iaizzo PA, Lehmann-Horn F: The in vitro determination of susceptibility to malignant hyperthermia. *Muscle & Nerve* 12:184-190, 1989. DOI: 10.1002/mus.880120304.
10. Iaizzo PA, Seewald M, Oakes SG, Lehmann-Horn F: The use of Fura-2 to estimate myoplasmic  $[\text{Ca}^{2+}]$  in human skeletal muscle. *Cell Calcium* 10:151-158, 1989. DOI: 10.1016/0143-4160(89)90069-9.
11. Lanier WL, Iaizzo PA, Milde JH: Cerebral function and muscle afferent activity following intravenous succinylcholine in dogs anesthetized with halothane: the effects of pretreatment with a defasciculating dose of pancuronium. *Anesthesiology* 71:87-95, 1989. DOI: 10.1097/00000542-198907000-00016.
12. Lehmann-Horn F, Iaizzo PA: Resealed fiber segments for the study of the pathophysiology of human skeletal muscle. *Muscle & Nerve* 13:222-231, 1990. DOI: 10.1002/mus.880130309.
13. Iaizzo PA, Lehmann-Horn F: The correlation between electrical after-activity and slowed relaxation in myotonia. *Muscle & Nerve* 13:240-246, 1990. DOI: 10.1002/mus.880130311.
14. Iaizzo PA, Seewald MJ, Powis G, Van Dyke RA: The effects of volatile anesthetics on  $\text{Ca}^{++}$  mobilization in rat hepatocytes. *Anesthesiology* 72:504-509, 1990. DOI: 10.1097/00000542-199003000-00019.
15. Quinlan JG, Iaizzo PA, Gronert GA, Lambert EH: Twitch response in a myopathy with impaired relaxation but no myotonia. *Muscle & Nerve* 13:326-329, 1990. DOI: 10.1002/mus.880130408.
16. Powis G, Seewald MJ, Sehgal I, Iaizzo PA, Olsen RA: Platelet-derived growth factor stimulates non-mitochondrial  $\text{Ca}^{2+}$  uptake and inhibits mitogen-induced  $\text{Ca}^{2+}$  signaling in Swiss 3T3 fibroblasts. *Journal of Biological Chemistry* 265:10266-10273, 1990. PMID: 2113051.
17. Lehmann-Horn F, Iaizzo PA, Franke C, Hatt H, Spanns F: Schwartz-Jampel syndrome: II.  $\text{Na}^{+}$  channel defect causes myotonia. *Muscle & Nerve* 13:528-535, 1990. DOI: 10.1002/mus.880130609.
18. Franke C, Hatt H, Iaizzo PA, Lehmann-Horn F: Characteristics of  $\text{Na}^{+}$  channels and  $\text{Cl}^{-}$  conductance in resealed muscle fibre segments from patients with myotonic dystrophy. *Journal of Physiology* 425:391-405, 1990. DOI: 10.1113/jphysiol.1990.sp018110.
19. Lanier WL, Iaizzo PA, Milde JH: The effects of intravenous succinylcholine on cerebral function and muscle afferent activity following complete ischemia in halothane-anesthetized dogs. *Anesthesiology* 73:485-490, 1990. DOI: 10.1097/00000542-199009000-00019.
20. Iaizzo PA: Histochemical and physiological properties of *Rana temporaria* tibialis anterior and lumbricalis IV muscle fibres. *Journal of Muscle Research and Cell Motility* 11:281-292, 1990. DOI: 10.1007/BF01766666.
21. Quinlan JG, Wedel DJ, Iaizzo PA: Multiple-pulse stimulation and dantrolene in malignant hyperthermia. *Muscle & Nerve* 13:904-908, 1990. DOI: 10.1002/mus.880131003.

22. Iaizzo PA, Olsen RA, Seewald MJ, Powis G, Stier A, Van Dyke RA: Transient increases of intracellular Ca<sup>2+</sup> induced by volatile anesthetics in rat hepatocytes. *Cell Calcium* 11:515-524, 1990. DOI: 10.1016/0143-4160(90)90027-R.
23. Lehmann-Horn F, Iaizzo PA: Are myotonias and periodic paralyses associated with susceptibility to malignant hyperthermia? *British Journal of Anaesthesia* 65:692-697, 1990. DOI: 10.1093/bja/65.5.692.
24. Iaizzo PA, Poppele RE: Twitch relaxation of the cat soleus muscle at different lengths and temperatures. *Muscle & Nerve* 13:1105-1112, 1990. DOI: 10.1002/mus.880131204.
25. Olsen RA, Seewald MJ, Melder DC, Berggren M, Iaizzo PA, Powis G: Platelet-derived growth factor blocks the increase in intracellular free Ca<sup>2+</sup> caused by calcium ionophores and a volatile anesthetic agent in Swiss 3T3 fibroblasts without altering toxicity. *Toxicology Letters* 55:117-125, 1991. DOI: 10.1016/0378-4274(91)90033-3.
26. Wedel DJ, Iaizzo PA, Milde JH: Desflurane is a trigger of malignant hyperthermia in susceptible swine. *Anesthesiology* 74:508-512, 1991. DOI: 10.1097/00000542-199103000-00020.
27. Iaizzo PA, Seewald MJ, Olsen R, Wedel DJ, Chapman DE, Berggren M, Eichinger HM, Powis G: Enhanced mobilization of intracellular Ca<sup>2+</sup> induced by halothane in hepatocytes isolated from swine susceptible to malignant hyperthermia. *Anesthesiology* 74:531-538, 1991. DOI: 10.1097/00000542-199103000-00023.
28. Iaizzo PA, Franke C, Hatt H, Spittelmeister W, Ricker K, Rüdel R, Lehmann-Horn F: Altered sodium channel behaviour causes myotonia in dominantly inherited myotonia congenita. *Neuromuscular Disorders* 1:47-53, 1991. DOI: 10.1016/0960-8966(91)90042-Q.
29. Lehmann-Horn F, Iaizzo PA, Hatt H, Franke C: Altered gating and conductance of Na<sup>+</sup> channels in hyperkalemic periodic paralysis. *Pflügers Archive* 418:297-299, 1991. DOI: 10.1007/BF00370530.
30. Seewald MJ, Eichinger HM, Lehmann-Horn F, Iaizzo PA: Characterization of swine susceptible to malignant hyperthermia by in vivo, in vitro and post-mortem techniques. *Acta Anaesthesiologica Scandinavica* 35:345-349, 1991. DOI: 10.1111/j.1399-6576.1991.tb03303.x.
31. Seewald MJ, Eichinger HM, Iaizzo PA: Malignant hyperthermia: an altered phospholipid and fatty acid composition in muscle membranes. *Acta Anaesthesiologica Scandinavica* 35:380-386, 1991. DOI: 10.1111/j.1399-6576.1991.tb03314.x.
32. Franke C, Iaizzo PA, Hatt H, Spittelmeister W, Ricker K, Lehmann-Horn F: Altered Na<sup>+</sup> channel activity and **reduced** Cl<sup>-</sup> conductance cause hyperexcitability in recessive generalized myotonia (Becker). *Muscle & Nerve* 14:762-770, 1991. DOI: 10.1002/mus.880140811.
33. Iaizzo PA, Wedel DJ, Gallagher WJ: In vitro contracture testing for determination of susceptibility to malignant hyperthermia: a methodological update. *Mayo Clinic Proceedings* 66:998-1004, 1991. DOI: 10.1016/S0025-6196(12)61722-4.
34. Pozos RS, Iaizzo PA: Shivering and pathological and physiological clonic oscillations of the human ankle. *Journal of Applied Physiology* 71:1929-1932, 1991. DOI: 10.1152/jappl.1991.71.5.1929.
35. Lanier WL, Iaizzo PA, Murray MJ: The effects of convective cooling and rewarming on systemic and central nervous system physiology in isoflurane-anesthetized dogs. *Resuscitation* 23:121-136, 1992. DOI: 10.1016/0300-9572(92)90197-K.
36. Iaizzo PA: The effects of halothane and isoflurane on intracellular Ca<sup>2+</sup> regulation in cultured cells with characteristics of vascular smooth muscle. *Cell Calcium* 13:513-520, 1992. DOI: 10.1016/0143-4160(92)90019-O.

37. Iaizzo PA, Pozos RS: Analysis of multiple EMG and acceleration signals of various record lengths as a means to study **pathological** and physiological oscillations. *Electromyography and Clinical Neurophysiology* 32:359-367, 1992. PMID: 1526216.
38. Pozos RS, Iaizzo PA: Effects of topical anesthesia on essential tremor. *Electromyography and Clinical Neurophysiology* 32:369-372, 1992. PMID: 1526217.
39. Deufel T, Müller-Felber W, Pongratz DE, Hübner G, Johnson K, Iaizzo PA, Lehmann-Horn F: Chronic myopathy in a patient suspected of carrying two malignant hyperthermia susceptibility (MHS) mutations. *Neuromuscular Disorders* 2:389-396, 1992. DOI: 10.1016/S0960-8966(06)80010-6.
40. Iaizzo PA, Seewald MJ, Powis G, Van Dyke RA: The effects of sevoflurane on intracellular Ca<sup>2+</sup> regulation in rat hepatocytes. *Toxicology Letters* 66:81-88, 1993. DOI: 10.1016/0378-4274(93)90082-9.
41. Zink RS, Iaizzo PA: Convective warming therapy does not increase the risk of wound contamination in the operating room. *Anesthesia and Analgesia* 76:50-53, 1993. DOI: 10.1213/00000539-199301000-00009.
42. Seewald MJ, Iaizzo PA, Heisswolf E, Eichinger HM: Effects of meat quality and storage on the breakdown of adenosine triphosphate in muscle from swine. *Meat Science* 35:47-61, 1993. DOI: 10.1016/0309-1740(93)90069-T.
43. Wedel DJ, Gammel SA, Milde JH, Iaizzo PA: Delayed onset of malignant hyperthermia induced by isoflurane and desflurane compared with halothane in susceptible swine. *Anesthesiology* 78:1138-1144, 1993. DOI: 10.1097/00000542-199306000-00018.
44. Otten W, Wirth C, Iaizzo PA, Eichinger HM: A high omega 3 fatty acid diet alters the fatty acid composition of heart, liver, kidney, adipose tissue and skeletal muscle in swine. *Annals of Nutrition and Metabolism* 37:134-141, 1993. DOI: 10.1159/000177761.
45. Beebe DS, Gauthier RL, DeMars JJ, Iaizzo PA: Lower extremity hypothermia is beneficial during infra-renal aortic cross-clamping in pigs. *Anesthesia and Analgesia* 77:241-249, 1993. DOI: 10.1213/00000539-199308000-00006.
46. Lanier WL, Iaizzo PA, Milde JH, Sharbrough FW: The cerebral and systemic effects of movement in response to a noxious stimulus in lightly anesthetized dogs. Possible modulation of cerebral function by muscle afferents. *Anesthesiology* 80:392-401, 1994. DOI: 10.1097/00000542-199402000-00019.
47. Iaizzo PA, Wedel DJ: Response to succinylcholine in porcine malignant hyperthermia. *Anesthesia and Analgesia* 79:143-151, 1994. DOI: 10.1213/00000539-199407000-00027.
48. Yamada H, Transfeldt EE, Tamaki T, Torres F, Iaizzo PA: The effects of volatile anesthetics on the relative amplitudes and latencies of spinal and muscle potentials evoked by transcranial magnetic stimulation. *Spine* 19:1512-1517, 1994. DOI: 10.1097/00007632-199407000-00018.
49. Iaizzo PA, Quasthoff S, Lehmann-Horn F: Differential diagnosis of periodic paralysis aided by in vitro myography. *Neuromuscular Disorders* 5:115-124, 1995. DOI: 10.1016/0960-8966(94)00036-9.
50. Wedel DJ, Quinlan JG, Iaizzo PA: Clinical effects of intravenously administered dantrolene. *Mayo Clinic Proceedings* 70:241-246, 1995. DOI: 10.1016/S0025-6196(11)64943-4.
51. Yamada H, Transfeldt EE, Tamaki T, Nishiura H, Taylor BA, Torres F, Iaizzo PA: General anesthetic effects on compound muscle action potentials elicited by single or dual spinal stimulation. *Journal of Spinal Disorders* 8:157-162, 1995. DOI: 10.1097/00002517-195504000-00011.

52. Lerche H, Fahlke C, Iaizzo PA, Lehmann-Horn F: Characterization of the high-conductance Ca(2+)-activated K<sup>+</sup> channel in adult human skeletal muscle. *Pflügers Archive* 429:738-747, 1995. DOI: 10.1007/BF00373997.
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54. Kokate JY, Leland KJ, Held AM, Hansen GL, Kveen GL, Johnson BA, Wilke MS, Sparrow EM, Iaizzo PA: Temperature-modulated pressure ulcers: a porcine model. *Archives of Physical Medicine and Rehabilitation* 76:666-673, 1995. DOI: 10.1016/S0003-9993(95)80637-7.
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56. Iaizzo PA, Kveen GL, Kokate JY, Leland KJ, Hansen GL, Sparrow EM: Prevention of pressure ulcers by focal cooling: histological assessment in a porcine model. *Wounds: A Compendium of Clinical Research and Practice* 7:161-169, 1995.
57. Lanier WL, Albrecht RF, Iaizzo PA: Divergence of intracranial and central venous pressures in lightly anesthetized, tracheally intubated dogs that move in response to a noxious stimulus. *Anesthesiology* 84:605-613, 1996. DOI: 10.1097/00132586-199704000-00027.
58. Iaizzo PA, Kehler CH, Zink RS, Belani KG, Sessler DI: Thermal response in acute porcine malignant hyperthermia. *Anesthesia and Analgesia* 82:782-789, 1996. DOI: 10.1097/00000539-199604000-00019.
59. Iaizzo PA, Kehler CH, Carr RJ, Sessler DI, Belani KG: Prior hypothermia attenuates malignant hyperthermia in susceptible swine. *Anesthesia and Analgesia* 82:803-809, 1996. DOI: 10.1097/00132586-199704000-00063.
60. Brass TJ, Loushin MK, Day JW, Iaizzo PA: An improved method for muscle force assessment in neuromuscular disease. *Journal of Medical Engineering and Technology* 20:67-74, 1996. DOI: 10.3109/03091909609008382.
61. Hansen GL, Sparrow EM, Kammamuri N, Iaizzo PA: Assessing wound severity with color and infrared imaging of reactive hyperemia. *Wound Repair and Regeneration* 4:386-392, 1996. DOI: 10.1046/j.1524-475X.1996.40317.x.
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1. **Iaizzo PA**, Anderson RH, Hill, AJ (Guest Editors). *Journal of Cardiovascular Translational Research, Special Issue on Cardiac Anatomy*, Springer Science + Business Media, New York, NY, April 2013.
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2. "Power-spectral analysis of physiological and pathological oscillations of the ankle," Neurologische Klinik der Technischen Universität München, Munich, FRG, August 28, 1986.
3. "The role of parvalbumins in the relaxation of frog skeletal muscle," Abteilung für Allgemeine Physiologie der Universität Ulm, Ulm, FRG, July 22, 1987.
4. "The diagnosis of malignant hyperthermia," Department of Anesthesiology, Mayo Clinic, Rochester, MN, December 22, 1987.
5. "The effects of halothane on malignant hyperthermia susceptible skeletal muscle," Department of Anesthesiology, Mayo Clinic, Rochester, MN, December 23, 1987.
6. "Physiology of muscular contraction," Department D'Anesthésie-Reanimation Chirurgicale I, Centre Hospitalier Régional DeLille, Lille, France, May 16, 1988.
7. "The effects of halothane and isoflurane on  $\text{Ca}^{2+}$  mobilization in rat hepatocytes," Department of Anesthesiology, Mayo Clinic, Rochester, MN, May 31, 1989.
8. "New insights into the pathophysiology of malignant hyperthermia," Department of Anesthesiology, Mayo Clinic, Rochester, MN, June 7, 1989.
9. "The effects of anesthetic agents on intracellular  $\text{Ca}^{++}$ ," Neurologische Klinik der Technischen Universität München, Munich, FRG, December 7, 1989.
10. "Mechanical and electrical properties of resealed fiber segments of human skeletal muscle," Departments of Anesthesiology and Physiology, Bowman Gray School of Medicine, Wake Forest University, Winston-Salem, NC, March 1, 1990.
11. "The use of resealed fiber segments of human skeletal muscle to study mechanical and electrical properties," Department of Physiology, Indiana University, Terre Haute Center for Medical Education, Terre Haute, IN, April 23, 1990.
12. "Resealed fiber segments for the study of electrical and mechanical properties of human skeletal muscle," Department of Pharmacology, University of North Dakota, Grand Forks, ND, May 3, 1990.
13. "The use of resealed fiber segments for the study of the pathophysiology of human skeletal muscle," Department of Anesthesiology, University of Minnesota, Minneapolis, MN, July 31, 1990.
14. "Electrophysiology of muscle disorders," Department of Veterinary Biology, University of Minnesota, Minneapolis, MN, January 17, 1991.

15. "In vitro electrophysiological studies of myotonic muscle," Department of Neurology, University of Minnesota, Minneapolis, MN, February 14, 1991.
16. "In vitro contracture testing to determine susceptibility to malignant hyperthermia," Department of Anesthesiology, University of Minnesota, Minneapolis, MN, May 26, 1991.
17. "Forced air cooling following exercise-induced heat stress," Department of Anesthesiology Research Conference, University of Minnesota, Minneapolis, MN, June 11, 1991.
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19. "In vitro contracture test," Department of Anesthesiology, University of Minnesota, Minneapolis, MN, 1st Annual Clinical Symposia, November 9, 1991.
20. "Investigations into the pathophysiology of human skeletal muscle," Department of Physiology, University of Minnesota, Minneapolis, MN, February 14, 1992.
21. "Anesthetics and intracellular Ca<sup>2+</sup>," Department of Anesthesiology Research Conference, University of Minnesota, Minneapolis, MN, April 14, 1992.
22. "The physiology of thermoregulation and the clinical occurrence of hypothermia," Department of Kinesiology, University of Minnesota, Minneapolis, MN, May 18, 1992.
23. "Physiological implications of malignant hyperthermia in humans and in the pig model," Lehrstuhl für Tierzucht der Technischen Universität München, Freising-Weihenstephen, Germany, July 30, 1992.
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25. "Intraoperative patient warming by convection: hygiene aspects with forced air," Zentrum Anaesthesiologie, Universität Göttingen, Göttingen, Germany, August 5, 1992.
26. "The physiology of thermoregulation: the consequences of hypothermia," Abteilung für Allgemeine Physiologie der Universität Ulm, Ulm, Germany, August 6, 1992.
27. "Thermoregulation in humans," Institut für Anaesthesiologie, Universität Erlangen, Erlangen, Germany, October 7, 1992.
28. "The physiology of thermoregulation," Department of Anesthesiology Research Conference, University of Minnesota, Minneapolis, MN, January 7, 1993.
29. "Increased muscle excitability: myotonia," Department of Neurology, University of Minnesota, Minneapolis, MN, April 3, 1993.
30. "Electrophysiological studies of human skeletal muscle," Department of Biomedical Engineering, University of Minnesota, Minneapolis, MN, April 20, 1993.
31. "The measurement of ankle torque for the diagnosis of periodic paralysis," Department of Anesthesiology, University of Minnesota, Minneapolis, MN, November 30, 1993.
32. "Thermal balance during an episode of malignant hyperthermia," Abteilung für Anästhesiologie und Intensivmedizin, Rehabilitationskrankenhaus Ulm, Ulm, Germany, September 21, 1993.
33. "Thermal balance during an episode of malignant hyperthermia," Department of Anesthesiology Research Conference, University of Minnesota, Minneapolis, MN, January 3, 1994.
34. "Thermoregulation and malignant hyperthermia," Institut für Tierzucht und Hausteirgenetik, Justus-Liebig-Universität, Gießen, Germany, May 5, 1994.
35. "Malignant hyperthermia: an update," Department of Anesthesiology Research Conference, University of Minnesota, Minneapolis, MN, September 6, 1994.

36. "Porcine model to study wound formation, healing, and prevention," 3M Health Care Division, St. Paul, MN, October 11, 1994.
37. "Temperature modulated pressure ulcers: a porcine model," Department of Biomedical Engineering, University of Minnesota, Minneapolis, MN, October 25, 1994.
38. "Porcine model to study wound formation, healing and prevention," Research Animal Resources, University of Minnesota, Minneapolis, MN, November 15, 1994.
39. "Malignant hyperthermia: variability in clinical presentation," Department of Anesthesiology, Mayo Clinic, Rochester, MN, January 25, 1995.
40. "Myotonic disorders," Department of Neurology, University of Minnesota, Minneapolis, MN, February 8, 1995.
41. "Biomedical aspects of heat transfer in humans," Engineering, Fachhochschule Anhalt, Köthen, Germany, March 27, 1995.
42. "Malignant hyperthermia: clinical presentation," Department of Neurology, Medizinischen Fakultät der Martin-Luther-Universität, Halle, Germany, March 28, 1995.
43. "The use of fluorophores to monitor modulations in intracellular  $[Ca^{2+}]$  in skeletal muscle," Muskelbiologie und Wachstum, Forschungsinstitut für die Biologie landwirtschaftlicher Nutztiere Fachbereich, Dummerstorf-Rostock, Germany, March 29, 1995.
44. "Malignant hyperthermia: variability in clinical presentation," Department of Anesthesiology Research Conference, University of Minnesota, Minneapolis, MN, May 2, 1995.
45. "Muscle force assessment in neuromuscular diseases," Muskelzentrum der Universität Ulm, Ulm, Germany, May 15, 1995.
46. "Malignant hyperthermia: muscle properties," Versuchsstation Thalhausen-Lehrstuhl für Tierzucht, Technische Universität München, Munich, Germany, May 23, 1995.
47. "Prevention of pressure ulcers by focal cooling," Center for Wound Healing and Reparative Medicine, Department of Surgery, University of Minnesota, Minneapolis, MN, February 5, 1996.
48. "Prevention of pressure ulcers by focal cooling," Department of Anesthesiology Research Conference, University of Minnesota, Minneapolis, MN, March 12, 1996.
49. "Prevention of pressure ulcers by focal cooling," Augustine Medical, Inc., Eden Prairie, MN, April 3, 1996.
50. "Muscle force assessment in neuromuscular disorders," Department of Neurology, Medizinischen Fakultät der Martin-Luther-Universität, Halle, Germany, May 2, 1996.
51. "Prevention of pressure ulcers by focal cooling," Muskelzentrum der Universität Ulm, Ulm, Germany, May 6, 1996.
52. "Anesthetic complication in muscle disorders," Department of Anesthesiology Research Conference, University of Minnesota, Minneapolis, MN, August 6, 1996.
53. "Anesthesia and neuromuscular disorders," Departement Anästhesie der Universität Kantonsspital Basel, Basel, Switzerland, September 30, 1996.
54. "Human thermoregulation," Departement Anästhesie der Universität Kantonsspital Basel, Basel, Switzerland, October 1, 1996.
55. "Anesthetic complications and neuromuscular disorders," Department of Anesthesiology, United Hospital, St. Paul, MN, December 5, 1996.
56. "Calcium dysregulation during anesthetic complications and neuromuscular disorders," Department of Laboratory Medicine, Jena, Germany, January 30, 1997.
57. "Anesthetic complications and neuromuscular disorders," Department of Neurology, Medizinischen Fakultät der Martin-Luther-Universität, Halle, Germany, January 30, 1997.

58. "Why perform clinical research?" Department of Anesthesiology Research Conference, University of Minnesota, Minneapolis, MN, March 15, 1997.
59. "Assessment of stimulated muscle force in humans," Clinical Neurosciences Conference, Department of Neurology, University of Minnesota, Minneapolis, MN, September 2, 1997.
60. "Assessment of stimulated muscle force in humans," Department of Animal Physiology, University of Wyoming, Laramie, WY, September 23, 1997.
61. "Axial spinal unloading using an LTX3000™ lumbar rehabilitation system," Muskelzentrum der Universität Ulm, Ulm, Germany, October 9, 1997.
62. "The physiological response to lumbar traction in humans," Department of Neurology, Medizinischen Fakultät der Martin-Luther-Universität, Halle, Germany, October 13, 1997.
63. "Stimulated muscle force assessment in humans," Tage der Elektrotechnik, Biomedizinischen Technik, Fachhochschule Anhalt, Köthen, Germany, October 15, 1997.
64. "Force assessment in overwintering black bears," Department of Anesthesiology Research Conference, University of Minnesota, Minneapolis, MN, January 13, 1998.
65. "Thermoregulation in humans and swine: a comparative analysis," Versuchsstation Thalhausen-Lehrstuhl für Tierzucht, Technische Universität München, Munich, Germany, April 17, 1998.
66. "In vivo stimulated force assessment for diagnosis and measurement of clinical outcomes," Muskelzentrum der Universität Ulm, Ulm, Germany, April 21, 1998.
67. "Critical thresholds for pressure ulcer formation in a porcine model: prevention by focal cooling," Biomedizinischen Technik, Fachhochschule Anhalt, Köthen, Germany, April 24, 1998.
68. "The physiological response to lumbar traction in humans," Departement Anästhesie der Universität Kantonsspital Basel, Basel, Switzerland, September 9, 1998.
69. "An in-vitro four-chamber working swine heart model," Faculty Research Highlights, Biomedical Engineering, University of Minnesota, Minneapolis, MN, September 29, 1998.
70. "An ex-vivo 4-chamber working heart model," Department of Anesthesiology Research Conference, University of Minnesota, Minneapolis, MN, January 1999.
71. "Studies in an animal model of the human working heart," Department of Neurology, Medizinischen Fakultät der Martin-Luther-Universität, Halle, Germany, April 14, 1999.
72. "An ex vivo working heart model: a collaborative project between the University of Minnesota and Medtronic," Biomedizinischen Technik, Fachhochschule Anhalt, Köthen, Germany, April 15, 1999.
73. "Collaborative research, academic and industry partnerships," BioRegioUlm and the Muskelzentrum der Universität Ulm, Ulm, Germany, April 16, 1999.
74. "An ex vivo working heart model: video images for education," LifeSource, Minneapolis, MN, May 6, 1999.
75. "Why clinical research?" Annual Clinicians Meeting, Spinal Designs International, Hinkley, MN, May 19, 1999.
76. "An ex-vivo 4-chamber working heart model," Department of Cardiology, Universität Ulm, Ulm, Germany, July 30, 1999.
77. "Assessment of stimulated muscle force in humans and hibernating black bears," Medtronic Scientific Forum Presentation, Medtronic, Fridley, MN, August 4, 1999.
78. "An ex-vivo 4-chamber working heart model," Department of Anesthesiology, Mayo Clinic, Rochester, MN, September 15, 1999.
79. "Gearing up for the next 50 years," *Keynote speaker*, Catheter Related Technology Symposium, Medtronic, Fridley, MN, September 21, 1999.

80. "Clinical Research," International Academy of Orthopedic Medicine, St. Paul, MN, November 11, 1999.
81. "Pain and pain mechanisms," International Academy of Orthopedic Medicine, St. Paul, MN, November 11, 1999.
82. "An ex-vivo 4-chamber working heart model," LifeSource, St. Paul, MN, January 11, 2000.
83. "Why and what research to perform?" Department of Anesthesiology Research Conference, University of Minnesota, Minneapolis, MN, October 3, 2000.
84. "Stimulated muscle force assessment: the ICU to hibernating bears," Department of Neurology, Universität Regensburg, Germany, April 19, 2001.
85. "Stimulated muscle force assessment: the ICU to hibernating bears," Department of Veterinary Pathobiology, University of Minnesota, Minneapolis, MN, September 12, 2001.
86. "Force assessment and weakness in the ICU," Clinical Neurosciences Conference, University of Minnesota, Minneapolis, MN, February 12, 2002.
87. "The Visible Heart," Health Informatics Seminar, University of Minnesota, Minneapolis, MN, February 14, 2002.
88. "The cardiac conduction system" Therapy Research, Cardiac Rhythm Management, Guidant Corporation, St. Paul, MN, April 17, 2002.
89. "Muscle contraction," Applied Research, Boston Scientific, Scimed, Minneapolis, MN, August 16, 2002.
90. "Skeletal muscle force assessment: from humans to bears," Department of Biomedical Engineering, Marquette University, Milwaukee, WI, October 4, 2002.
91. "The Visible Heart™: the collaborative development and use of this educational tool by the University of Minnesota and Medtronic," Biomedical Engineering Society Meeting, Houston, TX, October 24, 2002.
92. "Induction of mild hypothermia for cerebral protection," Design of Medical Devices Conference, University of Minnesota, Minneapolis, MN, April 24, 2003.
93. "The Visible Heart®: a large mammalian isolated heart model," Department of Surgery Transplant Conference, University of Minnesota, Minneapolis, MN, May 7, 2003.
94. "Update on human anatomical research," Pediatric EP Focus Group, Medtronic Cardiac Rhythm Management, Fridley, MN, September 15, 2003.
95. "The Visible Heart®: functional cardiac anatomy," Department of Medicine, University of Minnesota, Minneapolis, MN, January 14, 2004.
96. "Why study the hibernating black bear?" Department of Biomedical Engineering, University of Minnesota, Minneapolis, MN, April 19, 2004.
97. "The Visible Heart® Center," Medtronic Cardiac Rhythm Management, Fridley, MN, September 2, 2004.
98. "The Visible Heart® Center," Medtronic Minnesota Chapter American Society of Mechanical Engineers, University of Minnesota, Minneapolis, MN, September 22, 2004.
99. "A Working Industry/University of Minnesota Relationship," Nanotherapy Workshop, University of Minnesota, Minneapolis, MN, November 15, 2004.
100. "The Visible Heart™ Center," Minnesota Microscopy Society, St. Paul, MN, February 17, 2004.
101. "The Visible Heart™: video and simulation," Department of Applied Physiology, Universität Ulm, Ulm, Germany, April 21, 2005.
102. "Maintenance of muscle during hibernation," Department of Applied Physiology, Universität Ulm, Ulm, Germany, April 22, 2005.

103. "The Visible Heart®: functional cardiac anatomy," Departments of Neurology and Medicine, Universität Regensburg, Regensburg, Germany, April 26, 2005.
104. "The Visible Heart®: functional cardiac anatomy," Veterans Administration Hospital, San Juan, Puerto Rico, August 10, 2005.
105. "The Visible Heart® Center," Technical Forum, Medtronic Production and Engineering, Villalba, Puerto Rico, August 11, 2005.
106. "The Visible Heart® Center," Technical Forum, Medtronic Production and Engineering, Juncos, Puerto Rico, August 11, 2005.
107. "Translational research: from the bear den to the bedside," Technical Forum, Cardiac Rhythm Management, Medtronic, Minneapolis, MN, August 19, 2005.
108. "Translational research: from the bear den to the bedside," Minneapolis Surgical Society, Minneapolis, MN, September 19, 2005.
109. "Translational research: from the bear den to the bedside," Dialogue North, Itasca Community College Foundation, Grand Rapids, MN, April 27, 2006.
110. "A review of cardiac physiology and anatomy," Transoma Medical, Minneapolis, MN, June 26, 2006.
111. "Translational research: from the bear den to the bedside," Bioanalytik Weißenstephan, Technische Universität München, Freising, Germany, August 22, 2006.
112. "Cardiac pacing: the lead-tissue interface," Department of Applied Physiology, University of Ulm, Ulm, Germany, August 23, 2006.
113. "Functional cardiac anatomy: the Visible Heart®," Grand Rounds: Laboratory Medicine and Pathology, University of Minnesota, October 11, 2006.
114. "The Visible Heart®: an update," Lillehei Heart Institute, University of Minnesota, January 23, 2007.
115. "Translational research: from the bear den to the bedside," Lake Region Manufacturing Annual Business Meeting, Chaska, MN, January 26, 2007.
116. "The hibernating black bear," 32nd Annual Minnesota Association of Veterinary Technicians Convention, Minneapolis, MN, February 2, 2007.
117. "Malignant hyperthermia: a current view," Idaho Society of Anesthesiologists Annual Conference, Sun Valley, Idaho, March 3, 2007.
118. "Translational research: from bear den to bedside," Idaho Society of Anesthesiologists Annual Conference, Sun Valley, Idaho, March 4, 2007.
119. "A legacy of collaboration between the University of Minnesota and Medtronic: open-heart surgery, biomedical devices and the Visible Heart® Laboratory," 2<sup>nd</sup> Annual Patent Recognition Banquet, Cardiac Rhythm and Disease Management, Medtronic, McNamara Alumni Center, University of Minnesota, Minneapolis, MN, June 7, 2007.
120. "Translational research: from bear den to bedside," Departement Anästhesie der Universität Kantonsspital Basel, Basel, Switzerland, June 27, 2007.
121. "Pharmacological preconditioning to prevent ischemic muscle damage," Department of Applied Physiology, University of Ulm, Ulm, Germany, June 28, 2007.
122. "The Visible Heart®: functional human cardiac anatomy," Josephson and Wellens How to Approach Complex Arrhythmias for EP Fellows, Boston, MA, July 20, 2007.
123. "The Visible Heart®: functional human cardiac anatomy," Regions Hospital, Grand Rounds, St. Paul, MN, September 26, 2007.
124. "A legacy of collaboration between the University of Minnesota and Medtronic: open-heart surgery, biomedical devices and the Visible Heart® Laboratory," Cardiovascular, Medtronic, Fridley, MN, October 15, 2007.

125. "Benefits of anatomical donations for medical education and research," The Minnesota Commission of the Procurement and Use of Anatomical Donations in conjunction with LifeScience Alley, St. Paul, MN, February 7, 2008.
126. "The Visible Heart®: human cardiac anatomy," 28<sup>th</sup> Annual Spring Seminar, Minnesota Society of Diagnostic Ultrasound, Minneapolis, MN, March 29, 2008.
127. "The Visible Heart®: cardiac devices," 28<sup>th</sup> Annual Spring Seminar, Minnesota Society of Diagnostic Ultrasound, Minneapolis, MN, March 29, 2008.
128. "Endoscopic visualization of the coronary veins," CARDIOSIM 2008, 16<sup>th</sup> World Congress on Cardiac Electrophysiology and Cardiac Techniques, Nice, France, June 2008.
129. "An update on the Visible Heart® Project and the Atlas of Human Cardiac Anatomy," Lillehei Heart Institute, University of Minnesota, October 15, 2008.
130. "From research to bedside: perspectives from academia and industry," LifeScience Alley, Minneapolis, MN, October 28, 2008.
131. "An update on the Visible Heart® Project and the Atlas of Human Cardiac Anatomy," Grand Rounds, Department of Surgery, University of Minnesota, January 27, 2009.
132. "Pharmacological preconditioning to prevent ischemic muscle damage," Paul and Sheila Wellstone Muscular Dystrophy Center, University of Minnesota, January 30, 2009.
133. "Translational research: from bear den to bedside," Conservation Biology Graduate Program, University of Minnesota, Minneapolis, MN, February 16, 2009.
134. "The Visible Heart® Project and the Atlas of Human Cardiac Anatomy," 29<sup>th</sup> Annual Spring Seminar, Minnesota Society of Diagnostic Ultrasound, Minneapolis, MN, March 28, 2009.
135. "Translational research: from bear den to bedside," 29<sup>th</sup> Annual Spring Seminar, Minnesota Society of Diagnostic Ultrasound, Minneapolis, MN, March 2, 2009.
136. "The Visible Heart® Laboratory and the Atlas of Human Cardiac Anatomy," Department of Medicine, Martin Luther University, Halle/Saale, Germany, April 24, 2009.
137. "The Visible Heart® Laboratory, and the Atlas of Human Cardiac Anatomy," LifeSource, St. Paul, MN, June 2009.
138. "Translational research: from the bear den to the patient bedside," Department of Surgery Grand Rounds, University of Minnesota, Minneapolis, MN, August 18, 2009.
139. "The Visible Heart® Project and the Atlas of Human Cardiac Anatomy," Community Education Conference: Heart of the Matter, St. Joseph's Hospital, St. Paul, MN, October 12, 2009.
140. "A review of cardiovascular physiology and an update on the Visible Heart® Project," LifeSource, St. Paul, MN, October 12 & 14, 2009.
141. "Stimulated muscle force assessment: at the bear den or in an ICU," Department of Neurology Grand Rounds, University of Minnesota, Minneapolis, MN, February 11, 2010.
142. "Physiological engineering within the Visible Heart® Laboratory: guiding the laboratory forward to enhance future cardiovascular device designs," Horizon Series, co-sponsored by Medtronic's Bakken Society and Technical Fellows, Minneapolis, MN, February 22, 2010.
143. "Physiological engineering within the Visible Heart® Laboratory: using swine hearts to save human lives," 6<sup>th</sup> Annual Regional Bioscience Conference, Worthington, MN, March 26, 2010.
144. "The University of Minnesota: one of the pioneering institutions in the field of cardiovascular surgery," 30<sup>th</sup> Annual Spring Seminar, Minnesota Society of Diagnostic Ultrasound, Minneapolis, MN, March 27, 2010.
145. "Physiological engineering within the Visible Heart Laboratory," 2<sup>nd</sup> Annual University of Minnesota Cardiovascular Retreat, St. John's University, MN, June 24, 2010.



146. "The Visible Heart® Project," Department of Surgery Grand Rounds, University of Minnesota, Minneapolis, MN, August 31, 2010.
147. "The Visible Heart® Laboratory," Cardiovascular Innovation Seminars (CVIS), Medtronic, Mounds View, MN, September 1, 2010.
148. "Functional anatomy of the human heart: the Visible Heart® Project," Mayo Clinic Grand Rounds, Jacksonville, FL, November 8, 2010.
149. "Functional anatomy of the human heart: the Visible Heart® Project," Medtronic Venter, Natanya, Israel, December 2, 2010.
150. "Translational research: from the bear den to the patient bedside," Young Scientist Roundtable, Wayzata High School, Wayzata, MN, February 2011.
151. "Translational research: from the bear den to the patient bedside," Mini Medical School, University of Minnesota, Minneapolis, MN, March 21, 2011.
152. "The Visible Heart® Laboratory: our latest results," Department of Surgery Grand Rounds, University of Minnesota, Minneapolis, MN, January 31, 2012.
153. "New insights in heart physiology," Jubiläumssymposium, Martin-Luther-Universität, Halle-Wittenberg, Germany, April 3, 2012.
154. "Cardiovascular advances by the University of Minnesota: past, present and future," Boston Scientific, Maple Grove, MN, May 16, 2012.
155. "Malignant hyperthermia: a current view," New River Medical Center, Monticello, MN, July 12, 2012.
156. "The Visible Heart® Project: journey inside the heart," Paris, France, January 19, 2013.
157. "The Visible Heart® Laboratory and the Atlas of Human Cardiac Anatomy," Northern Ohio Cardiac Imaging Association, University Hospital, Case Medical Center, Cleveland, OH, April 13, 2013.
158. "The Visible Heart® Lab and the Atlas of Human Cardiac Anatomy," Physiological Research Laboratories, Medtronic, Coon Rapids, MN, August 14, 2013.
159. "The Visible Heart® Laboratory and the Atlas of Human Cardiac Anatomy," Skirball Research Center, Cardiovascular Research Foundation, New York, NY, August 19, 2013.
160. "The Visible Heart® Lab and Medtronic: a partnership between academia and industry," Annual Meeting of Halstad Society, University of Minnesota, Minneapolis, MN, September 12, 2013.
161. "Inside the human heart," I Am Hope LifeSource Symposium, Minneapolis, MN, November 7, 2013.
162. "The Visible Heart® Laboratory and the Atlas of Human Cardiac Anatomy," Innovations in Cardiovascular Interventions, Tel Aviv, Israel, December 1-4, 2013.
163. "Temperature regulation-modulation in clinical settings," Ambulatory Anesthesia Course, Universitätsspital, Basel, Switzerland, August 18-19, 2014.
164. "The Visible Heart Project and the Atlas of Human Cardiac Anatomy," Ambulatory Anesthesia Course, Universitätsspital, Basel, Switzerland, August 18-19, 2014.
165. "Priming innovation: the right environment, tools, partners, and mentors," Transcatheter Cardiovascular Therapeutics (TCT) Annual Conference, Washington DC, September 14, 2014.
166. "Understanding anatomy-device interactions of different bifurcation stent techniques: insights from the Visible Heart Lab," Transcatheter Cardiovascular Therapeutics (TCT) Annual Meeting, Washington DC, September 15, 2014.
167. *Keynote* "The Visible Heart Laboratory," 30<sup>th</sup> Annual Meeting of the Academy of Surgical Research, Hyatt Regency, Minneapolis, MN, September 19, 2014.

168. "Cardiovascular advances at the University of Minnesota: past, present, and future," Human Anatomy and Physiology Society Regional Conference, Eastview High School, Eagan, MN, October 17, 2014.
169. "The science of organ preservation and hidden secrets of the hibernating black bear," 8th Annual Department of Surgery Bakken Symposium, Minneapolis, MN, December 2, 2014.
170. "Evaluating your medical device idea using bench tests, animal tests and clinical trials," 2015 Innovation Workshop Program, Design of Medical Devices Conference, Minneapolis, MN, April 11, 2015.
171. "Muscle metabolism and function in the hibernating black bear," 6<sup>th</sup> Basel Muscle Symposium on Skeletal Muscle, Universitätsspital Basel, Basel, Switzerland, May 15, 2015.
172. "Prototyping in the real world: the Minnesota experience," Imaging in Cardiovascular Interventions (CSI 2015), Frankfurt, Germany, June 23, 2015.
173. *Keynote* "Innovation on the edge: from reanimated human hearts to hibernating black bears," Association of Medical Illustrators 2015 Annual Meeting, Cleveland Clinic, OH, July 22-25, 2015.
174. "Visualizations of cardiac anatomy, activation patterns, and therapy using Visible Heart methodologies," 8<sup>th</sup> TRF Forum on Computer Simulation and Experimental Assessment of Cardiac Function, Lugano, Switzerland, December 8, 2015.
175. "The Visible Heart Laboratory and the Atlas of Human Cardiac Anatomy," San Raffaele Hospital, Milan, Italy, December 9, 2015.
176. "Essentials of creativity," Academy of Innovation Day, 20th International Conference for Innovations in Cardiovascular Interventions (ICI), Tel Aviv, Israel, December 13, 2015.
177. "Testing your medical device idea: bench tests, pre-clinical, clinical trials," Academy of Innovation Day, 20<sup>th</sup> International Conference for Innovations in Cardiovascular Interventions (ICI), Tel Aviv, Israel, December 13, 2015.
178. "Innovation to the edge," University of Minnesota Alumni Association: Change Meets Innovation, Red Wing, MN, March 22, 2016.
179. "Ecosystem for the development of medical devices, Visible Heart Project," Cardiac Phytone Society, Seoul, South Korea, August 24, 2016.
180. "Inspiring structural heart innovation by understanding anatomy and disease states," Medical Design and Manufacturing Conference, Minneapolis, MN, September 21, 2016.
181. "Advanced applied imaging: 3D printing for cardiac disease," Lillehei Symposium: Progress in Cardiovascular Care, Minneapolis, MN, October 24, 2016.
182. "The Visible Heart® Project," 28<sup>th</sup> International Conference of the Society of Medical Innovation and Technology, Delft, The Netherlands, October 6, 2016.
183. White Bear Lake Rotary Club, White Bear Lake, MN, February 15, 2017.
184. "Black bear hibernation: healing the human heart," Learning Life Program, University of Minnesota, St. Paul, MN, February 16, 2017.
185. "From the Visible Heart Lab to bear dens and back," Texas Heart Institute, Houston, TX, February 23, 2017.
186. "Translational research through industry partnerships," Rice University, Houston, TX, February 23, 2017.
187. "The Visible Heart® Project and the Atlas of Human Cardiac Anatomy," Texas Heart Institute, Houston, TX, Cardiology-Electrophysiology Grand Rounds, February 24, 2017.
188. "How new medical products are developed," Clinical and Scientific Innovations for Oral and Maxillofacial Surgery (CSIOMS) Conference, Rosemont, IL, April 28, 2017.

189. "Having black bears assist in the operating room: good idea?" Organization of Biological Field Stations Annual Meeting, Itasca Biological Station and Laboratories, Lake Itasca, MN, September 22, 2017.
190. "Monitoring the behaviors of the American Black Bear using implantable devices," Graduate Program in Neuroscience Colloquium, University of Minnesota, Minneapolis, MN, October 4, 2017.
191. "The Visible Heart® Project and the Atlas of Human Cardiac Anatomy," Mini Medical School, University of Minnesota, Minneapolis, MN, October 16, 2017.
192. "From the Visible Heart® Lab to bear dens and back," Whiteside Institute for Clinical Research, St. Luke's Hospital, Duluth, MN, October 19, 2017.
193. "Insights relative to black bear physiology and potential implications for human medicine," 78th Midwest Fish and Wildlife Conference, Milwaukee, WI, January 30, 2018.
194. "The Visible Heart® methodologies employed to study electrophysiologic therapies and devices," Texas Heart Institute, Houston, TX, March 29, 2018.
195. "Translational research through industry partnerships," Rice University, Department of Biomedical Engineering, Houston, TX, March 29, 2018.
196. "The Visible Heart® Laboratory and the Atlas of Human Cardiac Anatomy," Texas Heart Institute, Houston, TX, March 30, 2018.
197. "From the Visible Heart® Lab to bear dens and back," Texas Heart Institute, Houston, TX, March 30, 2018.
198. "Translational applications of black bear hibernation for ischemic protection and/or wound healing," Children's Hospital, Magdeburg, Germany, May 3, 2018.
199. "The Visible Heart® Project and the Atlas of Human Cardiac Anatomy," Children's Hospital, Magdeburg, Germany, May 3, 2018.
200. "Visible Heart® Lab: driven to train the next generation of medical device innovators," Children's Hospital, Magdeburg, Germany, May 4, 2018.
201. "Visible Heart lab: driven to train the next generation of medical device innovators," 1st Annual Echo Supervisor Summit, September 5, 2018.
202. "The Visible Heart® Project and the Atlas of Human Cardiac Anatomy," University of Central Florida, Orlando, FL, October 15, 2018.
203. "Panel: industry trends in cardiology and the impact on your next device," MD&M Conference, Minneapolis, MN, November 1, 2018.
204. "Medical device innovation," University Hospital of Basel, Basel, Switzerland, November 12, 2018.
205. "Translational applications of black bear hibernation for ischemic protection and/or wound healing," University Hospital of Basel, Basel, Switzerland, November 13, 2018.
206. "Medical device innovation," Pitfalls and Pearls, Roseville Library, Roseville, MN, February 25, 2019.
207. "The Visible Heart® Project and the Atlas of Human Cardiac Anatomy," Internistische Intensivmedizin, Universitätsklinikum Magdeburg, Magdeburg, Germany. June 6, 2019.

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## WORKSHOPS

1. "Secondary changes in chloride channel diseases: sodium channel dysfunction," ENMC Workshop on Non-dystrophic Myotonias and Periodic Paralysis, Ulm, Germany, October 6, 1992.

2. "Anesthetic complications in muscle disorders (panel discussion)," VIII International Workshop on Malignant Hyperthermia, Minneapolis, MN, September 7, 1996.
3. "Futuristic technologies workshop," EP, Snowbird, UT, February 11, 2001.
4. "Academy of Innovation: the device development process," Innovations in Cardiovascular Interventions, Co-organizer, Tel Aviv, Israel, December 6, 2009.
5. "The Visible Heart: echocardiography and angiography application in the donor heart," National Association of Transplant Coordinators, National Meeting, Fort Lauderdale, FL, January 15, 2010.
6. "Review of cardiac anatomy and physiology," Lake Region Medical Training Workshop, University of Minnesota, Minneapolis, MN, November 24, 2010.
7. "Academy of Innovation: expanding cardiovascular therapies, the development of new medical devices," Innovations in Cardiovascular Interventions, Co-organizer, Tel Aviv, Israel, December 5, 2010.
8. "Academy of Innovation," Innovations in Cardiovascular Interventions, Tel Aviv, Israel, December 4-5, 2011.
9. "Becoming a medical technology innovator," Design of Medical Devices Conference, Medical Device Innovation Workshop, University of Minnesota, Minneapolis, MN, April 9, 2012.
10. "Academy of Innovation," Innovations in Cardiovascular Interventions, Tel Aviv, Israel, December 2-4, 2012.
11. "Becoming a medical technology innovator," Design of Medical Devices Conference, Medical Device Innovation Workshop, University of Minnesota, Minneapolis, MN, April 2013.
12. "Academy of Innovation," Innovations in Cardiovascular Interventions, Tel Aviv, Israel, December 2013.
13. "Becoming a medical technology innovator," Design of Medical Devices Conference, Medical Device Innovation Workshop, University of Minnesota, Minneapolis, MN, April 2014.
14. "Academy of Innovation," Innovations in Cardiovascular Interventions, Tel Aviv, Israel, December 2014.
15. "Becoming a medical technology innovator," Design of Medical Devices Conference, Medical Device Innovation Workshop, University of Minnesota, Minneapolis, MN, April 2015.
16. "Academy of Innovation," Innovations in Cardiovascular Interventions, Tel Aviv, Israel, December 2015.
17. "Becoming a medical technology innovator," Design of Medical Devices Conference, Medical Device Innovation Workshop, University of Minnesota, Minneapolis, MN, April 2016.
18. "Academy of Innovation," Innovations in Cardiovascular Interventions, Tel Aviv, Israel, December 2016.
19. "Becoming a medical technology innovator," Design of Medical Devices Conference, Medical Device Innovation Workshop, University of Minnesota, Minneapolis, MN, April 2017.
20. "3D modeling and virtual reality in lead extraction," 2017 Lead Extraction Symposium, Minneapolis, MN, October 28, 2017.
21. "Academy of Innovation," Innovations in Cardiovascular Interventions, Tel Aviv, Israel, December 2017.
22. "Becoming a medical technology innovator," Design of Medical Devices Conference, Medical Device Innovation Workshop, University of Minnesota, Minneapolis, MN, April, 2018.
23. "Academy of Innovation," Innovations in Cardiovascular Interventions, Tel Aviv, Israel, December 2018.
24. "Becoming a medical technology innovator," Design of Medical Devices Conference, Medical Device Innovation Workshop, University of Minnesota, Minneapolis, MN, April 2019.

25. Keynote: "The Visible Heart® Lab: Driven to train the next generation of medical device innovators," Workshop on VR in Medical Education, Magdeburg, Germany, June 7, 2019.

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## SYMPOSIUM / CONGRESS LECTURES

1. "Pathophysiology of malignant hyperthermia," 20th Scandinavian Congress of Anaesthesiology, Copenhagen, Denmark, June 28, 1989.
2. "Pathophysiology of malignant hyperthermia," VII International Congress of Neuromuscular Diseases, Co-Chairman of session on malignant hyperthermia, Munich, Germany, September 19, 1990.
3. "Malignant hyperthermia," 1st Annual Symposia on Clinical Anesthesiology, Department of Anesthesiology, University of Minnesota, Minneapolis, MN, November 6, 1991.
4. "Hypothermia post-bypass," American Association of Critical-Care Nurses, Minneapolis, MN, April 28, 1992.
5. "Physiology and biochemistry of muscle contraction," Anaesthesia and Pharmacogenetic Diseases: Malignant Hyperthermia, Co-chairman of session on Muscle contraction, Padova, Italy, May 22, 1993.
6. "The induction of mild hypothermia aided by facial warming," Department of Anesthesiology, 6th Annual Clinical and Research Symposium, University of Minnesota, Minneapolis, MN, September 27, 1997.
7. Keynote "Industry sponsored student research," Tage der Elektrotechnik, Fachhochschule Anhalt, Köthen, Germany, October 14, 1997.
8. "Force assessment in the ICU," Department of Anesthesiology, 7th Annual Clinical and Research Symposium, University of Minnesota, Minneapolis, MN, November 20, 1999.
9. "The Visible Heart™," Department of Anesthesiology, 8th Annual Clinical and Research Symposium, University of Minnesota, Minneapolis, MN, November 18, 2000.
10. "Physiology and pathophysiology of skeletal muscle," 21st Myron B. Laver International Postgraduate Course: Impact of Research on Anaesthesia and Intensive Care, University of Basel, Basel, Switzerland, March 16-17, 2001.
11. "Industry-funded basic research," 21st Myron B. Laver International Postgraduate Course: Impact of Research on Anaesthesia and Intensive Care, University of Basel, Basel, Switzerland, March 16-17, 2001.
12. "Malignant hyperthermia," 22nd St. Luke's Hospital and Regional Trauma Center's Annual Surgery Seminar, Duluth, MN, January 19, 2002.
13. "Clinical thermoregulation," Minnesota Society of Anesthesiologists Anesthesia Educational Symposium, Bloomington, MN, February 15, 2002.
14. "Clinical thermoregulation," Arrowhead Region Anesthesia Seminar, Duluth, MN, August 18, 2002.
15. "What's new in heart research," Medical Alley's 3rd Annual Health Care Technology Conference and Expo, Minneapolis, MN, November 17, 2004.
16. "Osteoporose-grundlagenforschung: Was können wir vom winterschlaf des baren lernen?" Osteoporose-eine wachsende Herausforderung, Anhaltinischer Therapeutentag, Hettstedt, Germany, April 23, 2005.
17. "Non-contact mapping and concomitant hemodynamic assessment for the study of heart diseases and their treatment," The Joint Meeting of 5th International Conference on Bioelectromagnetism & 5th International Symposium on Noninvasive Functional Source Imaging within the Human Brain and Heart, Minneapolis, MN, May 15, 2005.

18. Keynote "The Visible Heart®: functional cardiac anatomy," National Association of Transplant Coordinators National Meeting, Atlanta, GA, August 2, 2005.
19. "The Visible Heart®," Simulation in Healthcare at the University of Minnesota: Transforming Education, Minneapolis, MN, November 29, 2005.
20. "Educational activities of IEM" and "The Visible Heart®: device tissue interactions," Institute for Engineering in Medicine Symposium: A New Direction, University of Minnesota, Minneapolis, MN, February 15, 2008.
21. "Muscle trophic maintenance in man and other mammals," Symposium on Periodic Paralysis (PP) and Excitation-Contraction Coupling (ECC), Ulm, Germany, June 23, 2008.
22. "Novel views of valvular function: employing Visible Heart technologies," 2nd Annual Bakken Surgical Device Symposium, University of Minnesota, Minneapolis, MN, December 9, 2008.
23. "In vitro testing and the Visible Heart®," 3<sup>rd</sup> Annual Institute for Engineering in Medicine Educational Symposium, University of Minnesota, Minneapolis, MN, December 9, 2010.
24. Keynote "Functional anatomy of the human heart: Visible Heart® Project," Jubiläumssymposium von Prof. Karl-Ludwig Schober und 50-jähriges Jubiläum der ersten Herz-Operation mit Hilfe der hallechen Herz-Lungen-Maschine. Universitätsklinikum Halle (Saale), Germany, April 3, 2012.
25. Keynote "Cardiovascular advances by the University of Minnesota: past, present and future," 6th Annual Bakken Surgical Device Symposium, University of Minnesota, Minneapolis, MN, May 16, 2012.
26. Keynote "Back to the future: laboratory research on the isolated heart to enhance cardiovascular device design," International Society for Rotary Blood Pumps, Istanbul, Turkey, September 22, 2012.
27. "Lessons from field research: ischemic protection during black bear hibernation," Hibernation 3.0 Regional Conference, Duluth, MN, June 4, 2015.

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## EDUCATIONAL PRESENTATIONS

1. Visible Heart video display within the Human Body Exhibit, Minnesota Science Museum, St. Paul, Minnesota (1999 to present).
2. "Medicine: Prescription for Tomorrow," 42nd Annual Nobel Conference, Gustavus Adolphus College, St. Peter, MN, October 3-4, 2006.
3. Interactive Display on Cardiac Anatomy and Physiology, Heart Rhythm Society Meeting, Denver, CO, May 10-12, 2007.
4. Interactive Display on Cardiac Anatomy and Physiology, American Heart Association, Orlando, FL, November 4-7, 2007.
5. Interactive Display on Cardiac Anatomy and Physiology, Society of Thoracic Surgeons, Ft. Lauderdale, FL, January 26-30, 2008.
6. Interactive Display on Cardiac Anatomy and Physiology, American College of Cardiology, Chicago, IL, March 30-April 1, 2008.
7. Interactive Display on Cardiac Anatomy and Physiology, Heart Rhythm Society, San Francisco, CA, May 15-17, 2008.
8. Interactive Display on Cardiac Anatomy and Physiology, International Society of Minimally Invasive Cardiothoracic Surgery (ISMICS), Boston, MA, June 11-14, 2008.
9. Interactive Display on Cardiac Anatomy and Physiology, Academia Village, CARDIOSTIM 2008, 16th World Congress, Nice, France, June 18-21, 2008.

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## GRANTS AND FUNDING

### PROPOSALS IN REVIEW

1. “Swine isolated working heart model (contract extension FY21-25)”
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### CURRENTLY FUNDED GRANT PROPOSALS

1. “Swine isolated working heart model;” Medtronic; **Iaizzo PA**

Overall total costs of projects: \$9,526,198 (4/97 to Amendment 20)

- Initial contract (FY98): \$69,961 total, 4/97, 1 year (20% effort)
- Laboratory equipment and Medtronic devices: \$470,337, 5/98, 2 years (0% effort)
- Contract extension (FY99): \$129,604 total, \$110,000 in equipment, 5/98, 1 year (20% effort)
- Contract extension (FY00-02): \$641,191 total, 5/99, 3 years (20% effort)
- Contract extension (adjustment for FY01-02 and extension for FY03-05): \$1,485,061 total, 5/02, 3 years (20% effort; 20% salary support and 20% augmentation)
- Amendment 1: Additional project: \$20,001 total, 11/02, 1 year (1% effort)
- Amendment 2: Additional project: \$19,999 total, 11/02, 1 year (1% effort)
- Contract extension, Amendment 3 (FY06-10): \$2,543,088 total, 5/05, 5 years (20% effort; 20% salary support and 20% augmentation)
- Amendment 4: Additional project: \$39,997 total, 8/04, 1 year
- Amendment 5: Additional project: \$30,000 total, 5/05, 1.5 years (1% effort)
- Amendment 6: Additional project: \$14,336 total, 9/05, 1 year (1% effort)
- Amendment 7: Additional project: \$13,279 total, 4/06, 1 year (1% effort)
- Amendment 8: Additional project: \$66,502 total, 6/06, 1 year (1% effort)
- Amendment 9: Additional project: \$1,800 total, 7/06, 1 year
- Amendment 7+: Additional project: \$1,367 total, 11/07, 6 months
- Amendment 7+: Additional project: \$2,734 total, 12/07, 6 months
- Amendment 11: Additional project: \$39,092 total, 8/08, 1 year
- Amendment 12: Additional project: \$4,673 total, 11/08, 1 year
- Amendment 7+: Additional project: \$1,367 total, 2/09, 6 months
- Amendment 7+: Additional project: \$1,557 total, 11/08, 1 year
- Amendment 7+: Additional project: \$2,734 total, 2/10, 6 months
- Contract extension, Amendment 13 (FY11-15): \$4,085,371 total, 5/10, 5 years (20% effort)
- Amendment 7+: Additional project: \$9,454 total, 6/10, ongoing
- Amendment 7+: Additional project: \$11,345 total, 2/11, 1 year
- Amendment 15: Additional project: \$518,968 total, 9/11, 3 years
- Amendment 16: Additional project: \$9,850 total, 12/11, 1 year
- Contract extension, Amendment 18 (FY16-20): \$5,068,863 total, 5/15, 5 years (30% effort)
- Amendment 19: Additional project: \$59,459 total, 7/14, 1 year
- Amendment 19+: Additional experiments: \$24,378 total, 2015 (1 year)

- Amendment 20: Additional project: \$5,025 total, 7/15 (1 year)
  - Amendment 19+: Additional experiments; \$25,924 (2016)
2. “Minnesota Muscle Training Program;” NIH 5T32 AR007612; Thomas DD; \$571,796 total, 5/18 to 4/19.
  3. “Medical Scientist Training Program;” NIH; Shimizu Y; NIGMS 5T32 GM008244; \$597,888 direct, \$625,559 total; 5/18 to 4/19.
  4. “Summer Research at the University of Minnesota Medical School;” NIH 2R25 HL088728; Campbell CR; \$172,796 direct, \$186,620 total, 6/16 to 5/19.
  5. Earl E. Bakken Trust Funding, **Iaizzo PA**; \$70,000 (2 years); FY2016-2017, 0% effort (graduate student support).
  6. “Heart preservation and organ care system;” Lillehei Family Foundation; **Iaizzo PA**; \$250,000 over 4 years (\$50K 1/17; \$200K in 2018-2021), 0% effort (purchase/maintenance of organ care system for the heart).
  7. “Tissue characterization cooperative agreement—in vivo mechanical tissue properties via robotic smart tools;” Award W911NF-14-2-0035 ARL-HRED-STTC Tissue Characterization Research Initiative; US Army Medical Research and Materiel Command (USAMRMC); Kowalewski TM, (**Iaizzo PA, co-PI**); \$162,524 direct; 12/17 to 12/18, 0% effort.
  8. “Breakthrough tissue and organ preservation and transplantation using scaled-up nanowarming technology;” NIH 1R01 HL135046; Bischof JC; \$2,558,872 total; 8/17 to 7/21; PAI 4% effort for 3 years.
  9. “Organ banking for transplant-kidney cryopreservation by vitrification and novel nonwarming technology;” NIH 1R01 DK117425-01; Bischof JC; \$1,669,169 direct cost, \$690,229 indirect, \$2,359,398 total cost. 4/18 to 3/22, 4% effort for 4 years.

## FUNDED GRANT PROPOSALS

1. “The possible role of parvalbumins in skeletal muscle contraction;” National Science Foundation; Taylor SR, **Iaizzo PA**, Gerday C; \$7,650, 6/86, 2 years.
2. “Episodes of malignant hyperthermia and masseter spasms induced by succinylcholine;” Mayo Foundation; Wedel DJ, Iaizzo PA, Joyner MJ; \$24,810, 7/89, 1 year.
3. “The in vitro diagnosis of malignant hyperthermia: an equipment upgrade;” Mayo Clinic, Clinical Practice Committee; Wedel DJ, Iaizzo PA; \$41,925, Equipment grant.
4. “The determinants of coughing-induced increases in intracranial pressure in anesthetized dogs;” Mayo Foundation; Lanier WL, Iaizzo PA; \$19,101, 7/89, 1 year.
5. “The effects of I-653 on swine susceptible to malignant hyperthermia;” Anaquest; Wedel DJ, **Iaizzo PA**; \$19,002, 10/89, 1 year.
6. “The determinants of increases in intraocular pressure following intravenous succinylcholine in cats;” Mayo Foundation; Hofer RE, Lanier WL, Murray MJ, Iaizzo PA; \$22,132, 6/90, 1 year.
7. “The relative potency of desflurane, halothane and isoflurane as triggers of episodes of malignant hyperthermia;” Anaquest; Iaizzo PA, Wedel DJ, Milde JH; \$48,578, 9/90, 1 year.
8. “The effect of convection-induced corporeal hypothermia and rewarming on central nervous system temperature and metabolites;” Augustine Medical, Inc.; Lanier WL, Iaizzo PA, Sharbrough FW, Murray MJ; \$10,675, 1/91, 1 year.
9. “Are hyperkalemic periodic paralysis and paramyotonia the same entities?;” Muscular Dystrophy Association; Lehmann-Horn F, **Iaizzo PA**; \$90,000, 1/91, 3 years.



10. "The use of forced air cooling to aid in the treatment of malignant hyperthermia;" Minnesota Medical Foundation via a gift from Augustine Medical, Inc.; Iaizzo PA, Palahniuk RJ \$12,380, 4/91, 2 years.
11. "Forced air cooling for the treatment of exercise-induced heat stress;" Minnesota Medical Foundation via a gift from Augustine Medical, Inc.; Iaizzo PA, Leon AS, Palahniuk RJ \$4,900, 9/91, 2 years.
12. "The effects of lower limb surface warming on hypotension following the release of an aortic cross clamp and indices of lower extremity ischemia in pigs;" Minnesota Medical Foundation via a gift from Augustine Medical, Inc; Beebe DS, Gauthier RL, DeMars J, **Iaizzo PA** \$18,0600, 9/91, 1 year.
13. "Malignant hyperthermia induction in susceptible swine following exposure to ORG 9487;" Organon Grant # 95-9669; Wedel DJ, Iaizzo PA; \$69,249, 6/95, 2 years.
14. "The physiological response to lumbar traction in humans;" Spinal Designs International (via Center for Interfacial Engineering; Iaizzo **PA**, Sparrow EM; \$21,560, 6/94, 1 year.
15. "Temperature thresholds at which applied cooling prevents pressure ulcers and at which applied warming promotes healing;" National Science Foundation; Iaizzo PA, Sparrow EM \$49,999, 12/94, 1 year.
16. "Doxorubicin chemomyectomy for the treatment of cervical dystonia;" Dystonia Medical Research Foundation; McLoon L, Iaizzo PA, Dykstra D, Thompson L, Nguyen LT \$23,655, 4/96, 1 year.
17. "Center for Muscle and Muscle Disorders;" Graduate School, University of Minnesota; Day JW, Iaizzo PA; \$20,000, 7/96, 2 years.
18. "Doxorubicin chemomyectomy for the treatment of cervical dystonia;" Dystonia Medical Research Foundation; McLoon L, Iaizzo PA; \$23,65, 4/97, 1 year.
19. "Swine isolated working heart model;" Medtronic, Cardiac Rhythm Management – Therapy Delivery; **Iaizzo PA**, Houlton AJ; \$38,661 and \$31,300 in equipment, 5/97, 1 year.
20. "Muscle physiology and protein use by overwintering black bears;" National Science Foundation; Harlow H, Iaizzo PA, Smith-Sonneborn J, Beck TDI; \$301,598, 7/98, 3 years.
21. "Center for Muscle and Muscle Disorders;" Graduate School, University of Minnesota Day JW, Iaizzo PA; \$100,000, 7/98, 3 years.
22. "Axial unloading device therapy for cervical spine rehabilitation;" Spinal Designs and Minnesota Technology Incorporated; Iaizzo PA, Erdman AG; \$40,500, 1/99, 1.5 years.
23. "The effect of acute and subacute dexamethasone treatment on brain glucose and glycogen concentrations in anesthetized rats;" Pharmacia & Upjohn Company; Lanier WL, Thompson MD, Gallagher WJ, Iaizzo PA; \$5,000, 6/99, 2 years.
24. "Muscle force assessment in critically ill patients;" Center for Excellence in Critical Care and the Graduate School, University of Minnesota; Hong J, Sigg D, Iaizzo PA; \$1,000, 7/00, 1 year.
25. "The role of opioids in ischemic preconditioning of skeletal muscle;" Center for Muscle and Muscle Disorders; Sigg D, Iaizzo PA; \$4,000, 7/00, 1 year.
26. "Training program in muscle research;" National Institutes of Health, Institutional NRSA – NIAMS; Thomas D, et al.; \$1,478,495, 7/01, 5 years.
27. "Lab-based courses for BME undergraduates and practicing engineers;" The Whitaker Foundation; Tranquillo et al.; \$ 999,432, 1/02, 3 years.
28. "The role of delta-opioids in attenuating reperfusion injury: post conditioning;" Lillehei Heart Institute Grant Revision Award; Iaizzo PA; \$20,032 total, 5/02, 6 months.
29. "Force assessment in canines;" Merck, Inc.; Iaizzo PA; \$34,950 total, 12/02, 1 year.

30. "Opioid preconditioning of normal and dystrophic heart and skeletal muscle;" Paul & Sheila Wellstone Muscular Dystrophy Center, Nash Avery Award; Iaizzo PA; \$10,000 total, 3/04, 1 year.
31. "Opioid preconditioning in normal and dystrophic heart muscle;" Paul & Sheila Wellstone Muscular Dystrophy Center, Nash Avery award; Iaizzo PA; \$15,000 total, 8/05, 1 year.
32. Graduate student support, The Earl and Doris Bakken Foundation; Iaizzo PA; \$100,000, 4/05, 2 years.
33. "Using an IR camera to assess the effectiveness of back treatment;" National Institutes of Health, Phase I SBIR R43 AT004383-01; \$30,000 total, subcontract from Advanced Medical Electronics Corporation; Iaizzo PA; 1/08, 16 months.
34. "Development of a composite drug delivery and electrical sensing/stimulating implantable catheter;" Medical Devices Center of the Institute for Engineering in Medicine; Whitson B, Richardson ES, Iaizzo PA; \$25,000 total, 9/08, 1 year.
35. "Multidomal biomedical imaging;" Institute for Engineering in Medicine; He B, Iaizzo PA; \$400,000 total, 7/07, 2.5 years.
36. "Muscle force assessment system;" \$39,000 award from the Medical Device Center of the University of Minnesota, with \$10,000 matching funds from the 2007 Design of Medical Devices Conference; Durfee WK and Iaizzo PA; 1/08 to 1/10.
37. "Thermochemical ablation in image-guided interventions: initial assessment;" NIH R21; 1R21-CA133263-01; Cressman E, Bischof JC, Iaizzo PA, Jessurun J, \$268,944 direct, 4/08, 2 years.
38. "Molecular enhancement of cryosurgical ablation of the prostate;" AHC Translational Research Grant TRG #09-08; Metzger G, Bischof J, Slaton J, Iaizzo PA; \$133,333 total; 10/09 to 9/11 (translation of gold nanoparticle TNF delivery to enhance and image cryosurgical treatments of prostate cancer in a canine model).
39. "The non-invasive assessment of involuntary muscle forces and muscle diameters in critically ill ICU patients: correlations with extubation criteria;" Excellence in Critical Care Seed Grant; Iaizzo PA and Loushin MK; \$5,000 total, 2/10, 1 year.
40. Graduate student support, Bakken Fund for the Visible Heart Laboratory; Iaizzo PA; \$105,000, 11/11, 3 years.
41. "Quantification and Modeling of the Human Phrenic Nerve Anatomy;" IEM Seed Grant; Iaizzo P; \$40,000 direct, 1/12, 1 year.
42. "An Abnormal Detrusor Muscle Contraction Mapping Approach in Optimizing BTX Injection in Treating OAB;" IEM Seed Grant; Zhang Y, Iaizzo P, Nakib N, Erdman A, Timm G; \$39,833 direct, 1/12, 1 year.
43. "Muscular Dystrophy Center Core Laboratories;" NIH 5P30AR057220/1P30AR057220 (Ervasti JM. Day JW); 5% effort
  - 2013: \$573,800 total
  - 2012: \$604,000 total
  - 2011: \$604,000 total
  - 2010: \$601,450 total
  - 2009: \$600,175 total
44. "LHI Elementary/College Program," Lillehei Heart Institute, Iaizzo PA
  - 2017: \$50,000 (total)
  - 2016: \$50,000 total
  - 2015: \$50,000 total
  - 2014: \$50,000 total
  - 2013: \$50,000 total

45. "Minnesota Muscle Training Program;" NIH 5T32 AR007612; Thomas DD
  - 2017: \$606,558 total
  - 2016: \$473,239 total
  - 2015: \$463,441 total
  - 2014: \$449,250 total
  - 2013: \$455,523 total
  - 2012: \$457,752 total
  - 2011: \$430,218 total
  - 2010: \$438,101 total
  - 2009: \$438,762 total
  - 2008: \$329,857 total
  - 2007: \$313,066 total
  - 2006: \$170,926 total
  - 2005: \$193,567 total
  - 2004: \$182,218 total
  - 2003: \$168,098 total
  - 2002: \$155,516 total
46. "Medical Scientist Training Program;" NIH; NIGMS  
2T32GM008244/3T32GM008244/5T32GM008244; LeBien, TW, Shimizu Y;
  - 2017: \$516,115 total (+ one supplement of \$51,612)
  - 2016: \$511,061 total (+ two supplements of \$51,106 and \$86,400)
  - 2015: \$455,522 total
  - 2014: \$434,448 total
  - 2013: \$446,891 total
  - 2012: \$446,891 total
  - 2011: \$442,692 + \$49,188 total
  - 2010: \$438,610 + \$48,734 total
  - 2009: \$400,983 + \$44,953 + \$44,953 total
  - 2008: \$402,595 total
  - 2007: \$402,595 total
  - 2006: \$357,862 total
  - 2005: \$342,350 total
  - 2004: \$80,628 total
  - 2003: \$78,891 total
  - 2002: \$470,335 total
47. "Summer Research at the University of Minnesota Medical School;" NIH  
5R25HL088728/2R25HL088728/1R25HL088725; Campbell CR
  - 2016: \$157,464 total
  - 2015: \$157,464 total
  - 2014: \$157,464 total
  - 2013: \$149,906 total
  - 2012: \$157,464 total
  - 2011: \$127,872 total
  - 2010: \$127,872 total
  - 2009: \$127,872 total
  - 2008: \$127,872 total
  - 2007: \$127,872 total

48. "Image-guided Simulation-based Approach for Native and Prosthetic Aortic Valves in Patient-specific Anatomies;" Lillehei Heart Institute High Risk High Reward Grant; Iaizzo PA and Sotiropoulos F (Co-PIs); \$100,000 total (2 years); 3/14 to 2/16.
49. "Electroporation for selective, non-thermal, reversible and irreversible tissue ablation;" Minnesota Partnership for Biotechnology and Medical Genomics (capital equipment); Asirvatham SJ and Iaizzo PA (co-PIs); \$831,950 total; 7/14 to 8/16.
50. "Neuromuscular blockade assessment of motor point stimulation," Office of Discovery and Translation (ODAT), Translational Technologies and Resources (TTR) Core Usage Program; **Iaizzo PA**; \$3,500 (1 year); 1/15 to 1/16.
51. "Ice technology for cooling organs;" Dr. Robroy MacIver (research grant); **Iaizzo PA**; \$17,000 total; 6/15 to 5/18.
52. "3D imaging of congenital hearts;" Dr. Robroy MacIver (research grant); **Iaizzo PA**, Duncanson E (co-PIs); \$8,275 total; 1/16 to 12/16.
53. "3D human torso models;" James B. Linsmayer Foundation; **Iaizzo PA**; \$15,000; 12/15 to 1/17
54. "Human heart library and 3D printing;" Institute for Engineering in Medicine, University of Minnesota; **Iaizzo PA**; \$30,000; 6/16 to 5/17.
55. "Electroporation for selective, non-thermal, reversible and irreversible tissue ablation;" Minnesota Partnership for Biotechnology and Medical Genomics (research grant); Asirvatham SJ and **Iaizzo PA** (co-PIs); \$792,000 total; 2/15 to 12/17.
56. IEM support for heart library and 3D printing;" Institute for Engineering in Medicine; **Iaizzo PA**; \$30,000 direct; 5/16 to 5/18.
57. "Neuromuscular blockade assessments of motor point stimulation," Institute for Engineering in Medicine Seed Grant, Co-Principal Investigator (with W. Durfee); \$20,000 total (1 year); 1/15 to 1/18.
58. "Cardiovascular remodeling;" Institute for Engineering in Medicine Seed Grant, University of Minnesota; Barocas V and **Iaizzo PA**; \$75,000 (1/17 to 1/18).
59. "IEM Book and Education;" Institute for Engineering in Medicine; **Iaizzo PA**; \$50,000; 6/17 to 7/18, 0% effort (support IEM book administration and education/outreach).
60. "Medtronic Professor of Visible Heart Research;" Medtronic; **Iaizzo PA**; \$750,000 direct/total, 2/04 to 6/24.
61. "IEM Book and Education;" Institute for Engineering in Medicine; **Iaizzo PA**; \$50,000; 6/18 to 7/19, 0% effort (support IEM book administration and education/outreach).
62. "IEM Book and Education;" Institute for Engineering in Medicine; **Iaizzo PA**; \$50,000; 6/18 to 7/19, 0% effort (support IEM book administration and education/outreach).

#### ADDITIONAL STUDENT FUNDING

1. Biomedical Engineering Department Undergraduate Fellowships (\$25,000)  
*Kaleita (1995); Ariff (1997); Duke (1999); Reily (2000); Sullivan (2001)*
2. Biomedical Engineering Department Graduate Fellowships (\$10,000)  
*Quill (2005)*
3. Biomedical Engineering Institute (BMEI) Student Research Awards (\$155,000)  
*Kimmel (2003); Dupre (2003/4); Ahlberg (2004/5, 2005/6); Anderson (2005/6, 2006/7); Eggen (2006); Overgaard (2007)*
4. Doctoral Dissertation Fellowships (\$30,000)  
*Richardson (2008/9)*
5. GAANN Fellowships (\$360,000)

- Richardson (2006/07, 2007/8); Rolfes (2007/8); Thompson (2007/8); Howard (2008/9); Eggum (2009/10); Goff (2009/10); Mattison (2013/14); Schmidt (2013/14); Mattson (2014/15)*
6. Institute for Engineering in Medicine Grants (\$70,000)  
*Bateman (2008/9)*
  7. Life Sciences Summer Undergraduate Research Program (LSSURP) (\$64,000)  
*Engelhardt (1992); Kalb (1993); Leaven (1997); Wieland (1998); Brooks (1998); Chu (2001); Torgerson (2001); Castleman (2002); Horn (2002); Nore (2003); Galligan (2003); Campbell (2004); Gonzalez-Rodriguez (2006); Suarez-Rodriguez (2006); Finkton (2007); Perry (2007); Weinberger (2008); Usmani (2009); Constanzo (2009); Yeboa (2010); Zauner (2010); Patterson (2011); Gamble (2011); Marrero-Marrero (2012); Torres Roman (2012); Lezama (2013-4); Scott (2013); Hernandez (2014); Segarra (2015); Kelly (2015); Soto (2016)*
  8. Minnesota Medical Foundation Grants (\$20,000)  
*Bojanov (1999/2000); Duncan (1999/2000); Frattalone (2003); Geeslin (2008)*
  9. NIH Muscle Training Grant (D Thomas, PI, PA Iaizzo, Co-PI) (\$375,370)  
*Eggen (2007/8, 2008/9); Frommer (2004/5, 2005/6, 2006/7); Rolfes (2009/10, 2010/11); Howard (2011/12, 2012/13); Mattison (2015/6, 2016/7)*
  10. National Science Foundation (SURPE, REU, and SEED Programs) (\$33,000)  
*Held (1993); Kerkow (1993), Lackas (1993, 1994); Leland (1993); Goodson (1994); Harp (1994); Lao (1994); Bangsund (1995); Lindblom (1997); Aggarwal (1998)*
  11. Research Explorations Program (\$16,500)  
*Cruz Arcedo (1993); Esterberg (1993); Arcedo (1994); Falkenberg (1994); Field (1994); Heidmann (1994); Gengenbach (1995); Jauregui (1995); Carlson (1996); Seifert (1996); Koff (1996)*
  12. Undergraduate Research Opportunities Program (UROP) Awards (\$34,100)  
*Solovey (1994); Wisniewski (1995); Nguyen (2002/3); Oommen (2003); Choi (2004); Skadsberg (2004); Wallace (2004); Youtsos (2004/5); Mika (2005); Kelley (2006/7); Ezzat (2006); Powell (2007); Dockendorf (2009); Tetzner (2009); Balto (2011); Schmidt (2011); Zauner (2011); Gangeness (2013/14); Richter (2014); Empanger (2014/15); Cho (2016)*
  13. North Star Stem Project Award (\$2,100)  
*Mbachu (2010)*
  14. Earl E. Bakken Foundation Fund  
\$105,000 (2011-2013)  
\$70,000 (2014-2015)  
\$70,000 (2016-2017)

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## EDUCATIONAL FUNDING

1. Course: New Product Design and Business Development; \$1,000,000+ (48 projects) 1995-present.
2. Book: Handbook of Cardiac Anatomy, Physiology and Devices; Lillehei Heart Institute, University of Minnesota; \$10,000, 2004
3. Book: Handbook of Cardiac Anatomy, Physiology and Devices; Biomedical Engineering Institute, University of Minnesota; \$10,000, 2004
4. Book: Textbook of Cardiac Anatomy, Physiology and Devices; Institute for Engineering in Medicine, University of Minnesota; \$5,000, 2008

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## LICENSING AGREEMENTS

1. US 7,045,279: Use of an isolated perfused heart preparation for device design and medical imaging (P-8207). Exclusive licensing agreement with Medtronic from 5-10 to 4-20 (10 years), \$100,000 annually.
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## UNRESTRICTED RESEARCH GIFTS

1. "Human thermoregulation and wound healing;" Augustine Medical, Inc.; **Iaizzo PA** Approximately \$400,000 4-95 through 2002
  2. "Lumbar traction using an LTX3000™ lumbar rehabilitation system;" Spinal Designs International; **Iaizzo PA** ; approximately \$300,000 1-95 through 2002
  3. "Ergonomic comfort and spinal alignment;" Select Comfort; **Iaizzo PA**; \$40,000 4-97, 1 year
  4. "Human thermoregulation and patient warming gowns;" Arizant Healthcare, Inc.; **Iaizzo PA**; \$6,200 9-03
  5. "A retrospective analyses of the Low Back Rehabilitation Program," Spinal Designs International; **Iaizzo, PA**; \$13,000 9-05.
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## PATENTS

### ISSUED US PATENTS

1. US 5,800,480: Support apparatus with a plurality of thermal zones providing localized cooling. Augustine SD, **Iaizzo PA**, Sparrow EM, Johnson PS, Arnold RC: Issued September 1, 1998.
2. US 5,837,002: Support apparatus with localized cooling of high-contact-pressure body surface areas. Augustine SD, **Iaizzo PA**, Sparrow EM, Johnson PS, Arnold RC, Stapf DE: Issued November 17, 1998.
3. US 5,860,292: Inflatable thermal blanket for convectively cooling a body. Augustine SD, **Iaizzo PA**: Issued January 19, 1999.
4. US 6,010,528: Support apparatus which cradles a body portion for application of localized cooling to high-contact-pressure body surface areas: Augustine SD, **Iaizzo PA**, Sparrow EM, Johnson PS, Arnold RC: Issued January 4, 2000.
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