



## **CBE Consultants, Inc.**

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### **Robert S. Cargill II, PhD, PE**

*President, Principal Engineer*

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Dr. Robert S. Cargill II is the President of CBE Consultants, Inc. Dr. Cargill applies his expertise in the principles of bioengineering to projects emphasizing the interaction between a biological system and the physical environment, particularly issues involving the biomechanics of human injury in the areas of human tolerance, occupant kinematics, and rigid body dynamics. Dr. Cargill is a seasoned testifier with testimony experience in multiple state and federal jurisdictions. His areas of specialized interest include the conceptualization, design, analysis, and evaluation of medical devices and related products, as well as in-depth forensic investigation of traumatic human injury related to machine design and failure using his specialized knowledge of industrial and construction machinery, power tools, hand tools, amusement rides, and firefighting and rescue equipment.

Previously the Engineering Director at JP Research, Inc. and President of Cargill Bioengineering, LLC, and prior to that a Senior Managing Engineer with Exponent, Inc., Dr. Cargill has many years' experience evaluating forensic issues related to injury causation and product liability concerning: power tools (portable and stationary); specialized fall protection, firefighting, and rescue equipment; amusement rides and devices; industrial and construction equipment; elevators and escalators; automobiles and heavy trucks; and premises liability. In addition, he has designed and evaluated specialized products in the areas of medical devices and firefighting equipment.

Dr. Cargill has also performed original research in the areas of traumatic brain injury and cell and tissue biomechanics. He has experience in cell and tissue culture techniques, research equipment design and construction, computer and physical modeling, and computer programming.

Dr. Cargill has lectured in the Department of Mechanical and Aerospace Engineering at Princeton University, the Department of Mechanical Engineering and Orthopaedics at the University of British Columbia, and the Department of Mechanical Engineering at the Cooper Union. He has been an Adjunct Associate Professor at Widener University and Villanova University, a member of the academic faculty at the George W. Woodruff School of Mechanical Engineering at the Georgia Institute of Technology, and a Research Associate and Post-Doctoral Fellow at the University of Pennsylvania.

Dr. Cargill is a licensed professional engineer in Alabama, New Jersey, and Pennsylvania. He was also an active firefighter and Incident Safety Officer for Greenfields Volunteer Fire Company in New Jersey (2002 to 2020). In addition to his extensive firefighter and rescue training and experience, he previously held certification as an Emergency Medical Technician in New York and Connecticut (1986 to 1990).

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## Education, Memberships, and Professional Honors

University of Pennsylvania	Ph.D., Bioengineering	1994
University of Pennsylvania	M.S.E., Bioengineering	1991
Rensselaer Polytechnic Institute	B.S., Biomedical Engineering (Magna Cum Laude) Minor in Biology, Pre-medical Certificate	1989

Tau Beta Pi

Extensive training in firefighting, rescue, and emergency medical services

## Patents and Inventions

U.S. Patent 8,852,211, "Surgical Device." Awarded October 7, 2014

U.S. Patent 9,358,008, "Surgical Device." Awarded June 7, 2016

U.S. Patent 9,700,324, "Surgical Clip Applicator." Awarded July 11, 2017

U.S. Patent 10,278,700, "Surgical Device." Awarded May 7, 2019

## Licenses and Certifications

Licensed Professional Engineer, Pennsylvania, # PE073156

Licensed Professional Engineer, Alabama, # 28150-E

Licensed Professional Engineer, New Jersey, # GE048308

Commercial Driver's License, Class B, State of New Jersey

New Jersey Division of Fire Safety Certifications, ID No. 149170:

Firefighter 1; Fire Officer 1; Fire Officer 2

Hazardous Materials: Awareness; Hazardous Materials: Operational  
Incident Management, Level 1; Incident Management, Level 2

## Memberships and Professional Affiliations

ASTM International (member)

National Society of Professional Engineers (member)

Pennsylvania Society of Professional Engineers (member)

## Professional Society Activities

National Society of Professional Engineers:

Panelist at the FDA External Defibrillator Improvement Initiative Workshop representing the NSPE, December 15, 2010

ASME Bioengineering Division:

Abstract review, ASME Summer Bioengineering Conference, Marco Island, FL, 2008

Session Chair: Cell and Molecular Engineering, ASME Summer Bioengineering  
Conference, Marco Island, FL, 2008

ASTM Committee Memberships:

F04 on Medical and Surgical Materials and Devices, 2001–present

F24 on Amusement Rides and Devices, 2008–present

- F24.24 Acceleration Task Group, 2011–present

- F24.24 Large Rider Phenomena Task Group, 2014–2017

E48 on Biotechnology, 2001–2008

International Association of Amusement Parks and Attractions

ISO/TC 254/WG 1 Technical Expert

### Professional and Board Activities

Pennsylvania Society of Professional Engineers, Philadelphia Chapter:

President, 2016–2017

President Elect, 2015–2016

Vice President, 2014–2015

Chapter Director, 2012–2014, 2018-present

Trustee, 2020-present

Villanova University:

School of Engineering, Adjunct Faculty

- EGR2021 Elements of Biomedical Engineering, Spring 2018 and Spring 2019

Temple University:

Department of Bioengineering External Advisory Board, Member, 2015–present

Widener University:

Department of Mechanical Engineering, Adjunct Associate Professor

- Senior Design Group Adviser, 2011–2012

Biomedical Engineering Program Industrial Advisory Group, Member, 2011–2016

- Chairman, 2012–2015

Biomedical Engineering Program Industrial Focus Group, Participant, March 17, 2011

Scientific Advisory Board, ZSX Medical LLC, Member, 2009–present

### Professional Experience

Throughout his professional career, Dr. Cargill has gained experience that includes: Conducting analyses of amusement park rides to examine the rider kinematics and the potential for injuries associated with the ride and compared forces experienced on rides with activities of daily living. Analyzing a variety of elevator incidents to evaluate injury causation; included inspections of elevators and measurement of the elevators' accelerations to evaluate the elevator motion and determine the corresponding motions of and forces acting on the elevator occupants. Performing biomechanical reconstructions and analyses of the causation of injuries from accidents involving stationary and portable power tools, including power miter saws, pneumatic nailers, angle grinders, table saws, and band saws; conveyor systems; and other industrial and commercial products. Utilizing medical records, physical evidence, and testimony to reconstruct accidents and determine how injuries may or may not have been caused. Performing demonstrative testing to illustrate mechanisms of injury. Reviewing medical records for the purpose of evaluating the extent, distribution, and severity of injuries; the health and biomechanical status of the individual; and the past medical history as it relates to biomechanical analyses and claims. Performing reviews of medical imaging films/modalities such as CT, MRI, and plain films to determine the distribution and extent of injuries in the context of the anatomy.

**CBE Consultants, Inc.**, Media, Pennsylvania*President, Principal Engineer, 2020-Present*

Directs and provides technical support for biomechanics-focused research and litigation projects for a variety of clients. Project expertise includes biomechanics of human injury and investigation into human injury in the areas of human tolerance, occupant kinematics, and rigid body dynamics. Project experience includes evaluation of injury causation and product liability issues for amusement rides and devices, vehicles, industrial and construction equipment, power tools, specialized protective equipment (falls, firefighting, and rescue), and medical devices.

**JP Research, Inc.**, Philadelphia, Pennsylvania*Engineering Director, Biomechanics Practice, 2017–2020*

Directed and provided technical support for biomechanics-focused research and litigation projects throughout JP Research. Supervised and mentored biomechanics staff and directed the operation of the Pennsylvania office of JP Research.

**Cargill Bioengineering LLC**, West Deptford, New Jersey*President, 2009–2017*

Consulted on biomechanics for a variety of clients. Key projects included: Research and development for a laparoscopically-applied absorbable wound closure device. Certification of an amusement ride to ASTM F2291 standard. Research, development, and design consulting for start-up medical device companies. Development and construction of a custom device to gather respiratory research data from patients.

**Exponent, Inc.**, Philadelphia, Pennsylvania*Senior Managing Engineer (starting at Senior Engineer), 2001–2009*

Responsible for managing and supporting biomechanics projects. Key projects included: Directed the dynamic testing and biomechanical evaluation of the Fire Department City of New York (FDNY) Personal Safety System (PSS). Participated in the general design review, testing, evaluation, and implementation of the system. The PSS is a compact, lightweight escape system intended for use by firefighters for quick escape from burning buildings. This device was named the [best safety invention](#) of 2006 by TIME Magazine. In December of 2007, this device was successfully used by an FDNY member to save his own life after he became entrapped in a burning building. Directed the technical development of a second-generation prototype of a non-invasive medical device to evaluate flow in a ventriculo-peritoneal shunt; included complete redesign of hardware, development of an instructional video, and development of a training surrogate. Evaluated the biomechanical requirements for a human allogeneic graft material and developed a test protocol for the supplier; project centered on evaluating the creep characteristics of the client's processed materials against a competitor's.

**George W. Woodruff School of Mechanical Engineering  
(Georgia Institute of Technology)**, Atlanta, Georgia*Assistant Professor, 1995–2001***University of Pennsylvania**, Philadelphia, Pennsylvania*Research Associate and Post-Doctoral Fellow, 1989–1995*

## Relevant Volunteer Experience

### Journal Review (Previous)

Journal of the American Podiatric Medical Association

Journal of Urology

Transactions of the IEEE: Transactions on Engineering Education

Transactions of the ASME: Journal of Biomechanical Engineering

Society of Automotive Engineers: 2006 World Congress, 2014 World Congress & Exhibition

Medical Engineering & Physics

### Grant Review

Ad Hoc Reviewer, The Technology Foundation STW, Netherlands (2005)

Ad Hoc Reviewer, Southern Consortium for Injury Biomechanics, United States (2004)

Ad Hoc Reviewer, Medical Research Council, United Kingdom;

NIH Special Emphasis Panels: ZRG1 SSS-G(10), Clinical Science Special Emphasis Panel (1998)

### Other Activities

Greenfields Volunteer Fire Company

Member, 2001-2022

Volunteer Firefighter, 2001–2020

Incident Safety Officer, 2009–2020

President, 2009–2011

New Jersey State Fireman's Relief Organization, West Deptford Township

Treasurer, 2011–2016

West Deptford Township Emergency Services Coordinating Council

Recording Secretary, 2012–2015

## Selected Presentations and Publications

### Published Papers

“High rate shear strain of three-dimensional neural cell cultures: A new in vitro traumatic brain injury model,” *Journal of Biomechanics* 2005; 38:5:1093–1105. (LaPlaca MC, Cullen DK, McLoughlin JJ, **Cargill II RS**)

“Mechanical stretch to neurons results in a strain rate and magnitude dependent increase in plasma membrane permeability,” *Journal of Neurotrauma* 2003; 20(10):1039–1049. (Geddes DM, **Cargill II RS**, LaPlaca MC)

“Susceptibility of hippocampal neurons to mechanically-induced injury,” *Experimental Neurology* 2003; 184:420–427. (Geddes DM, LaPlaca MC, **Cargill II RS**)

“An in vitro model for neural injury: Device characterization and calcium response to mechanical injury,” *ASME Transactions: Journal of Biomechanical Engineering* 2001; 123:247–255. (Geddes DM, **Cargill II RS**)

“An assessment of the strength of NG108-15 cell adhesion to chemically modified surfaces,” *Biomaterials* 1999; 20:2417–2425. (**Cargill II RS**, Dee KC, Malcolm S)

“Active and passive compliance of the fetal bovine bladder,” *Journal of Urology* 1997; 158(3/2):1094–1099. (Dean GE, **Cargill II RS**, Macarak EJ, Snyder HM, Duckett JW, Levin R)

- “Shortening of the first metatarsal following closing base wedge osteotomy,” *Journal of the American Podiatric Medical Association* 1997; 87(5):199–208. (Banks AS, **Cargill II RS**, Carter S, Ruch JA)
- “Acute alterations in  $[Ca^{2+}]_i$  in NG108-15 cells subjected to high strain rate deformation and chemical hypoxia: An in vitro model for neural trauma,” *Journal of Neurotrauma* 1996; 13(7):395–407. (**Cargill II RS**, Thibault LE)
- “High strain rate tissue deformation: A theory on the mechanical etiology of diabetic foot ulcerations,” *Journal of the American Podiatric Medical Association* 1995; 85(10):519–527. (Landsman AS, Meaney DF, **Cargill II RS**, Thibault LE, Macarak EJ)

### Conference Proceedings

- “Frontal, Lateral, and Free-Operation Impacts of Amusement Bumper Cars: Vehicle Kinematics and Occupant Kinematics,” SAE Technical Paper 2018-01-0543, presented at the 2018 SAE World Congress, doi:10.4271/2018-01-0543. (Bussone WR, Moore T, Locey C, **Cargill R**)
- “The effects of anthropometry on driver position and clearance measures,” Paper 2006-01-0454 presented at the 2006 SAE World Congress, April 3–6, 2006. (Bove RT, Fisher JL, Ciccarelli L, **Cargill II RS**, Moore TLA)
- “Head kinematics and upper neck loading during simulated low-speed rear-end collisions: A comparison with vigorous activities of daily living,” Paper 2006-01-0247 presented at the 2006 SAE World Congress, April 3-6, 2006. (Vijayakumar V, Scher I, Gloeckner DC, Pierce J, Bove R, Young D, **Cargill II RS**)
- “Development of a computational method to predict occupant motions and neck loads during rollovers,” Paper 2005-01-0300 presented at the 2005 SAE World Congress, April 11, 2005. (Yamaguchi GT, Richards D, Larson RE, Carhart MR, **Cargill II RS**, Lai W, Corrigan CF)
- “Head accelerations experienced during everyday activities and while riding roller coasters,” Proceedings, 48<sup>th</sup> Annual Meeting of the Human Factors and Ergonomics Society, New Orleans, LA, 2004. (Arndt SR, Hammoud SA, **Cargill RS**)
- “Everyday life accelerations,” Injury Insights, Publication of the National Safety Council, p. 6–7, June/July 2003. (Arndt SR, **Cargill RS**)
- “Bladder contraction following stretch stimulation: The myogenic response,” Presentation to the American Academy of Pediatrics, 1996. (Dean GE, **Cargill RS**, Snyder HM, Duckett JW, Levin R)
- “The use of in vitro models for neural injury with superimposed hypoxia in the development of new head injury tolerance criteria,” 1992 International IRCOBI Conference on the Biomechanics of Impacts, Verona, Italy, p. 203–212, September 9–11, 1992. (**Cargill RS**, Thibault LE)

### Conference Presentations/Abstracts

- “Safety Glasses are Effective at Protecting Eyes from Nails in Free Flight Driven by Pneumatic Nailers,” Podium presentation, D3 Injury Prevention – PPE & Equipment Session, National Occupational Injury Research Symposium, Kingwood, West Virginia, May 20, 2015. <http://www.cdc.gov/niosh/noirs/2015/> (**Cargill II RS** and Cargill SK)
- “Injury biomechanics: Evaluating the evidence to determine causation,” SBC2008-193123. Podium presentation at the ASME Summer Bioengineering Conference, Marco Island, FL, June 26, 2008. (**Cargill II RS**, Heller MF)



- “Mechanical properties of the fetal bovine bladder lamina propria and their correlation with changes in extracellular matrix,” SBC2008-193131. Poster presentation at the ASME Summer Bioengineering Conference, Marco Island, FL, June 26, 2008. (**Cargill II RS**, Toosi KK, Macarak EJ)
- “Current trends in amusement industry biomechanics,” Oral presentation, International Association of Amusement Parks and Attractions (IAAPA) Attractions Expo 2006 Annual Conference and Trade Show, Atlanta, GA, November 16, 2006. (**Cargill II RS**, Scher I, Bussone W, Heller M)
- “Characterization of occupant anthropometry and clearance measures in passenger cars,” Oral presentation, Session 244 Risk Assessment: Disease, Health, and Harm, Joint Statistical Meetings, Seattle, WA, August 8, 2006. (Steffey D, Bove R, Fisher J, Ciccarelli L, **Cargill II RS**, Moore T)
- “Examining bumper cars as a surrogate for low-speed rear-end and frontal collisions,” Oral presentation, Track 5. Occupational and Impact Injury Biomechanics, 5<sup>th</sup> World Congress of Biomechanics, Munich, Germany, July 31, 2006. (Scher I, **Cargill II RS**, Vijayakumar V, Richards D, Kuzel M)
- “Hippocampal neurons are more susceptible to mechanical stretch than cortical neurons,” Poster presentation at the Neurotrauma Symposium: Annual Meeting of the National Neurotrauma Society, 2001. (Geddes DM, LaPlaca MC, **Cargill II RS**)
- “Neural stretch results in a transient permeability change that depends on strain rate and magnitude,” Podium presentation at the Annual Fall Meeting of the Biomedical Engineering Society, Durham, NC, 2001. (Geddes DM, LaPlaca MC, **Cargill II RS**)
- “Development of a three-dimensional finite element model of lateral cortical impact injury in rat with geometry generated from MR images,” Podium presentation at the ASME Summer Bioengineering Conference, Snowbird, UT, 2001. (Murnyack, RM, **Cargill II RS**, LaPlaca MC)
- “Surface treatment to enhance neuronal adhesion to a silicon-based elastic substrate,” Presented at the ASME Summer Bioengineering Conference, Snowbird, UT, 2001. (Watts R, Hoover J, Geddes DM, Garcia A, **Cargill II RS**)
- “Progesterone attenuates mitochondrial injury in an in vitro model of TBI,” Presented at the ASME Summer Bioengineering Conference, Snowbird, UT, 2001. (Malcolm SG, Geddes DM, **Cargill RS**)
- “Calcium protects neurons from lysing after experimental TBI,” Presented at the Neurotrauma Symposium: Annual Meeting of the National Neurotrauma Society, New Orleans, LA, 2000. (Geddes DM, **Cargill RS**)
- “Progesterone protects neurons from mitochondrial damage after in vitro TBI,” Presented at Neurotrauma Symposium, Annual Meeting of the National Neurotrauma Society, New Orleans, LA, 2000. Finalist: Student Poster Competition. (Malcolm SG, **Cargill RS**)
- “Cyclic mechanical strain inhibits proliferation of bovine bladder smooth muscle cells,” Presented at the International Bladder Symposium, Washington, D.C. November 4–7, 1999. (Davis NP, **Cargill II RS**)
- “Progesterone is protective at the cellular level in an in vitro model of TBI,” Presented at the 1999 Neurotrauma Symposium: Annual Meeting of the National Neurotrauma Society, Miami, FL, 1999. (**Cargill II RS**, Geddes DM, Malcolm S, Hoffman SW)
- “The progesterone receptor antagonist, RU486, does not block progesterone's ameliorative effects on recovery following bilateral medial frontal cortex contusions in the rat,” Presented at the 1999 Neurotrauma Symposium: Annual Meeting of the National

- Neurotrauma Society, Miami, FL, 1999. (Goss CW, Hoffman SW, **Cargill II RS**, Chambers M, Epstein O, Stein DG)
- “Calcium alterations in mechanically injured neural-like cells,” Presented at the 1999 Neurotrauma Symposium: Annual Meeting of the National Neurotrauma Society, Miami, FL, 1999. (Geddes DM, **Cargill RS**)
- “A novel in vitro shear device for high strain rate injury of three-dimensional neural cultures,” Presented at the 1999 Neurotrauma Symposium: Annual Meeting of the National Neurotrauma Society, Miami, FL, 1999. (McLoughlin JJ, **Cargill RS**, LaPlaca MC)
- “Calcium alterations in mechanically injured neural-like cells,” Presented at the 1999 Annual Meeting of the Biomedical Engineering Society, Atlanta, GA, 1999. (Geddes DM, **Cargill RS**)
- “A novel in vitro shear device for high strain rate injury of three-dimensional co-cultures of neurons and astrocytes,” Presented at the 1999 Annual Meeting of the Biomedical Engineering Society, Atlanta, GA, 1999. (McLoughlin JJ, **Cargill RS**, LaPlaca MC)
- “A high strain rate, equibiaxial deformation device for studying the functional sequelae of traumatic brain injury at the cellular level,” Presented with abstract at the 3<sup>rd</sup> World Congress of Biomechanics, Hokkaido University, Sapporo, Japan, August 2–8, 1998. (**Cargill RS**, Chitre Y, Springer HK, Geddes DM)
- “An in vitro model of the isolated neural cell in traumatic brain injury,” Presented with abstract in Cellular Deformation: Mechanics and Mechanisms of Physiological Response, Emory University School of Medicine, Atlanta, GA, October 23–24, 1997. (**Cargill RS**)
- “Response of neural cells to an acute mechanical deformation,” 1997 Annual Meeting of the Biomedical Engineering Society, San Diego, CA, October 2–5, 1997. *Annals of Biomedical Engineering* 25(Suppl. 1):S-49. (Chitre Y, Springer HK, **Cargill RS**)
- “A device for the application of equibiaxial strain to cultured bovine bladder smooth muscle cells,” 1997 Annual Meeting of the Biomedical Engineering Society, San Diego, CA, October 2–5, 1997. *Annals of Biomedical Engineering* 25(Suppl. 1):S-47. (Davis NP, **Cargill RS**)
- “Collagen composition of fetal bovine bladder lamina propria determines mechanical properties,” 91<sup>st</sup> Annual Meeting of the American Urological Association, Orlando, FL, May 4–9, 1996. (**Cargill RS**, Kucich U, Macarak EJ)
- “The extracellular matrix contributes little to stiffness in the fetal bovine bladder,” 1<sup>st</sup> International Bladder Symposium, Boston, MA, March 29–31, 1996. Dean GE, **Cargill RS**, Snyder III HM, Duckett JW, Levin R ()
- “Changes in intracellular calcium concentration in young and senescent endothelial cells injured with dynamic mechanical loads,” *FASEB Experimental Biology* 1995; 95. (Landsman AS, **Cargill RS**, Meaney DF, Macarak EJ, Thibault LE)
- “Changes in the ratio of lamina propria to detrusor thickness during bladder filling may be developmentally regulated,” 90<sup>th</sup> Annual Meeting of the American Urological Association, Las Vegas, NV, April 23–28, 1995. (Koo HP, Chang SL, Howard PS, **Cargill RS**, Levin RM, Macarak EJ)
- “Strain and strain rate dependence of the mechanically induced increase in cytosolic free calcium of neural-like cells,” Abstracts of the 2<sup>nd</sup> World Congress of Biomechanics, II:208b, Amsterdam, The Netherlands, 1994. (**Cargill RS**, Thibault LE)



- “Intracellular free calcium shifts in cultured neurons in response to mechanical injury,” 11<sup>th</sup> Annual Neurotrauma Symposium, Washington, D.C., 1993. (LaPlaca MC, **Cargill RS**, Thibault LE)
- “A new system to study mechanical deformation and the resultant calcium transients in endothelial cells,” *Advances in Bioengineering*, ASME, Anaheim, CA, 1992. (Landsman AS, Thibault LE, Meaney DF, **Cargill RS**)
- “In vitro model for neural trauma,” Abstracts of the 1<sup>st</sup> World Congress of Biomechanics, II:319, La Jolla, CA, 1990. (**Cargill RS**, Thibault LE)
- “Albumin transport across cultured endothelial monolayers under acute anoxic conditions,” *Thrombosis and Haemostasis* 1989; 62(1):580. (Bizios R, Holleran LA, Iveson RD, **Cargill RS**, Fenton II JW)
- “Effect of temperature on albumin transport across cultured endothelial monolayers,” *The FASEB Journal*, Abstracts 2:A727, 1988. (**Cargill RS**, Iveson RD, Holleran LA, Bizios R)
- “Effect of thrombin on albumin transport across cultured endothelial monolayers under acute hyperoxic conditions,” *The FASEB Journal*, Abstracts 2:A823, 1988. (Iveson RD, Holleran LA, **Cargill RS**, Bizios R, Fenton II JW)
- “Albumin transport across cultured endothelial monolayers under acute hypoxic conditions,” *The FASEB Journal*, Abstracts 2, A1158, 1988. (Holleran LA, Iveson RD, **Cargill RS**, Bizios R, Fenton II JW)
- “Decreased albumin transport across cultured endothelial monolayers in the presence of antioxidants under acute hyperoxia,” *The FASEB Journal*, Abstracts 2:A823, 1988. (Bizios R, Holleran LA, Iveson RD, **Cargill RS**)
- “Cultured endothelial monolayers: a model for transport studies,” *Physics in Medicine and Biology* 1988; 33(Suppl. 1):249. (Bizios R, **Cargill RS**, Iveson RD, Holleran LA)

### **Invited Presentations/Seminars**

- “Forensic Biomechanics,” Cooper Union for the Advancement of Science and Art, guest lecture in Injury Biomechanics and Safety Design, April 20, 2021. (**Cargill RS**)
- “Forensic Biomechanics,” Cooper Union for the Advancement of Science and Art, guest lecture in Injury Biomechanics and Safety Design, April 29, 2016. (**Cargill RS**)
- “Eyes, Safety Glasses, and Nail Guns: The Biomechanical Perspective,” Trial Attorneys of America Annual Meeting. June 14, 2013. (**Cargill RS**)
- “The New ANSI Standard on Compliant Safety Glasses and What It Means from a Biomechanical Viewpoint,” Defense Research Institute, Product Liability Conference. April 5, 2013. (**Cargill RS**)
- “Use of a Biomechanic both in Preparation for and Testimony at Trial,” Trial Attorneys of America Annual Meeting, June 10, 2010. (**Cargill RS**)
- “Forensic Biomechanics,” Cooper Union for the Advancement of Science and Art, guest lecture, May 5, 2008. (**Cargill RS**)
- “Skull and face injury, brain injury, and head protection,” University of British Columbia, guest lecture for Injury Biomechanics, October 5, 2005. (**Cargill RS**)
- “Skull and face injury, brain injury, and head protection,” University of British Columbia, guest lecture for Injury Biomechanics, October 20, 2004. (**Cargill RS**)
- “From cells to tissues and organs,” Guest lecture for MAE 344, Princeton University, April 14, 2004. (**Cargill RS**)

- “Understanding mechanisms of injury,” Saint Christopher’s Hospital for Children, Philadelphia, PA, January 24, 2004 (Continuing Medical Education Seminar as part of Education Day). **(Cargill RS)**
- “Understanding mechanisms of injury,” Medical College of Pennsylvania Hospital, December 2, 2003 (Seminar to 60-75 pre-hospital care providers). **(Cargill RS)**
- “Injury analysis: falls to motor vehicle collisions,” Symposium on Specialized Trauma Patients, Medical College of Pennsylvania Hospital, June 11, 2003 (Continuing Medical Education). **(Cargill RS)**
- “From cells to tissues and organs,” Guest lecture in MAE 344, Princeton University, April 15, 2003. **(Cargill RS)**
- “From cells to tissues and organs,” Guest lecture for MAE 435, Princeton University, April 22, 2002. **(Cargill RS)**
- “TBI at the level of the cell: What is the value in cellular research?” Exponent, Failure Analysis Group, Philadelphia Office, December 21, 2000; University of Kentucky, Spinal Cord and Brain Injury Research Center, October 23, 2000. **(Cargill RS)**
- “The Role of mechanical environment in normal and abnormal bladder physiology,” Pediatric Urology Group Seminar Georgia Urology, Atlanta, GA, January 1999. **(Cargill RS)**
- “Neural injury and repair,” Annual Spring Symposium of the Atlanta Chapter of the Society for Neuroscience, “Changes in Membrane Potential in Neural-Like Cells Exposed to Mechanical Deformation,” Emory University, Atlanta, GA, April 1998. **(Cargill RS)**
- “The mechanical environment at the cellular level and its role in cellular development and homeostasis,” Emory University Physiology Department Seminar, Emory University, Atlanta, GA, September 1996. **(Cargill RS)**

### **Presentations/Seminars**

- “A cell culture model for traumatic brain injury,” Student Seminar, University of Pennsylvania, Philadelphia, PA, December 1991. **(Cargill RS)**
- “In vitro models of neural injury,” Central Nervous System Injury Journal Club University of Pennsylvania, Philadelphia, PA, February 1993. **(Cargill RS)**
- “Ion fluxes in mechanically injured neural-like cells,” Central Nervous System Injury Research Conference, University of Pennsylvania, Philadelphia, PA, April 1993. **(Cargill RS)**
- “In vitro studies of ion transport in neural cells,” Central Nervous System Injury Research Conference, University of Pennsylvania, Philadelphia, PA, December 1993. **(Cargill RS)**
- “Development of an autologous bladder augmentation device,” NIH/A.F.U.D. Physician and Scientist in Training Program Research Presentation, National Institutes of Health, Bethesda, MD, July 1995. **(Cargill RS)**; Presentation delivered by Dr. Robert Levin in my absence).
- “Cellular and tissue biomechanics,” Engineering of Living Tissues, Educational Partners Meeting Georgia Institute of Technology, Atlanta, GA, January 1996. **(Cargill RS)**
- “Cell and tissue biomechanics,” Student Chapter of the Biomedical Engineering Society, Georgia Institute of Technology, Atlanta, GA, January 1996. **(Cargill RS)**
- “Neural injury and bladder development: Cellular mechanical environment as a factor in pathophysiology,” Bioengineering Educational Partners Symposium Georgia Institute of Technology, Atlanta, GA, September 1997. **(Cargill RS)**

“Benefits of Professional Licensure,” Penn Engineering Alumni Society. Presented to School of Engineering and Applied Sciences students at the University of Pennsylvania, Philadelphia, PA, March 2016. (Carlsen T and **Cargill RS**)

“Amusement Rides: How much thrill is too much?” Philadelphia Chapter of the Pennsylvania Society of Professional Engineers. Presented at the PE Boot Camp held at Drexel University, Philadelphia, PA. September 27, 2019. (**Cargill RS**)