Curriculum Vitae of Young I. Cho

Professor
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EDUCATION

Ph.D. -1980, Mechanical Engineering, University of Illinois, Chicago
M.S. -1977, Mechanical Engineering, University of Illinois, Chicago
B.S. -1972, Mechanical Engineering, Seoul National University, Korea

PROFESSIONAL BACKGROUND

Professor Young I. Cho joined Drexel University in the Fall of 1985 as a tenure-track assistant professor, was promoted to associate professor in 1987, and to full professor in 1992. Since he joined the school, he has developed a non-Newtonian flow and heat transfer laboratory and has initiated the investigation of a non-chemical water treatment technology to prevent fouling from various heat exchangers. He has been instrumental in developing a number of new technologies such as a new scanning capillary tube viscometer for blood viscosity measurement in clinical environments, an electronic-descaling technology based on a solenoid-coil concept, and a new refrigeration technology using a vortex tube. Currently, he is developing methods of applying low-temperature plasma technology to mineral and bio fouling problems caused by hard water.

In 1986 and 1989, he served as one of US delegates to the US-Korea Heat Transfer Conference and Fluid Flow Conference both sponsored by NSF held in Seoul, Korea. He received two NASA Space Act Tech Brief Awards (NPO-17237) and (NPO-16593) for his work on the flow visualization of tip vortex generated by a helicopter rotor blade. He was the recipient of the 1992 Lindback Award for excellence in teaching at Drexel University. In 1993, Dr. Cho was nominated by U.S. DOE and elected as the chairman of the Advanced Fluid Committee under International Energy Agency. In 1995, he was the recipient of the Research Professor of the Year at Drexel University.

During the summer of 1986, he had a Summer Faculty Appointment at the Argonne National Laboratory, IL, to work on a Department of Energy project to develop an advanced degradation-free non-Newtonian fluid. During the summer of 1990, he worked as a Summer Faculty at Newport News Shipbuilding to investigate the automated grease lubrication problem in the design of the Navy's underwater vehicle.

Prior to joining Drexel University, he spent four years at the Jet Propulsion Laboratory, California Institute of Technology, as a Member of the Technical Staff. At JPL he was involved in a number of experimental and analytical investigations in the field of heat transfer, fluid mechanics, acoustics and energy. Included was the development of an acoustic steam flow meter

for the Department of Energy (Office of Industrial Program) and a study of aircraft cabin fire during crash landing for FAA.

Professor Cho has authored/co-authored approximately one hundred and fifty papers in the area of heat transfer, fluid mechanics, rheology, aerodynamics, acoustics, combustion and energy. He is a reviewer for ASME Applied Mechanics Reviews, J. of Heat Transfer, International Journal of the Heat and Mass Transfer, AIChE Journal, J. of Biomechanics, J of Biomechanical Eng., AIAA, and Chemical Engineering Communications. He is an editor for *Handbook of Heat Transfer* (McGraw Hill, 3rd ed.) and Heat Transfer-Asian Research (Wiley), and the *Advances in Heat Transfer* (Academic Press).

He has been cited in Who's Who in the East, Who's Who in the American Education, Who's Who in Science and Engineering, Who's Who in the Emerging Leaders in the World, Who's Who in America, and Who's Who in the World.

Curriculum Vitae

Young I. Cho
Professor

PERSONAL

Date of Birth: November 26, 1949 (U.S. citizen)

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EDUCATION

B.S. 1972, Mechanical Engineering, Seoul National University, Korea
M.S. 1977, Mechanical Engineering, University of Illinois, Chicago
Ph.D. 1980, Mechanical Engineering, University of Illinois, Chicago

PRINCIPAL FIELDS OF INTEREST

Plasma Water Treatment
Gliding arc plasma and hydrogen gas production
Anti-Fouling Technology for Heat Exchangers
Flows and Heat Transfer of Non-Newtonian Fluids
Hemorheology and cardiovascular disease

SUMMARY OF EXPERIENCE

9/92 - present Professor, Dept. of Mechanical Eng. & Mechanics, Drexel University

Visiting Professor, Mechanical Engineering Dept., ChonBuk National Univ (Korea) Sept. - Dec. 2006
Visiting Professor, Mechanical Engineering Dept., ChonBuk National Univ (Korea) Sept. - Dec. 2005
Visiting Professor, Mechanical Engineering Dept., POSTECH, Pohang (Korea) Sept. - Dec. 2004

Developed new research interests in the following areas:
Application of low-temperature plasma technology to water applications

Method to remove scale from heat exchangers using electromagnetic force

Developed a disposable blood viscometer, measuring circulating blood viscosity over a range of shear rates without anticoagulants.

Dr. Cho has been involved in Drexel's new engineering educational experience (E^4 and currently tDEC). He has taught MSFEI (freshman) and Energy I and II (sophomore) course sequences.

Was the recipient of the 1992 Lindback Award for excellence in teaching at Drexel University.

Was nominated by U.S. DOE and elected as the chairman of the Advanced Fluid Committee under International Energy Agency in 1993.

Editor of the Handbook of Heat Transfer (3rd. ed.) McGraw Hill (1998)
Editor of the Advances in Heat Transfer (Academic Press) Annual publication
Editor of the Heat Transfer-Asian Research

Adjunct Professor at Radiology Department, Jefferson University Medical Hospital.

9/87-8/92 Associate Professor

Conducted sponsored research in :
Heat Transfer of Viscoelastic Fluids in Sudden Expansion Tube
Fluid Modeling of Gel Electrophoresis for Separation of Intact DNA Molecules
Heat Transfer Enhancement with Phase-Change Materials
Hemodynamic Study for the Etiology of Atherosclerosis

Received two NASA Space Act Tech Brief Awards (NPO-16593) and (NPO-17237).

Served as a US delegate to the US-Korea Fluid Engineering Conference sponsored by NSF held in Seoul, Korea.

Awarded a Summer Faculty Appointment at the Newport News Ship Building Company to study the centralized lubrication system for underwater vehicle in 1990 Summer.

Became an Associate Editor for the Advances in Heat Transfer, Academic Press.

9/85-8/87 Assistant Professor

Conducted sponsored research in Development of Falling Needle Viscometer,
Heat Transfer Enhancement with Phase-Change Materials

Served as a US delegate to the US-Korea Heat Transfer Conference sponsored by NSF held in Seoul, Korea.

Awarded a Summer Faculty Appointment at the DOE's Argonne National Laboratory, IL, to develop advanced degradation-free non-Newtonian fluids in 1986 Summer.

9/81-8/85 Member of Technical Staff
Jet Propulsion Laboratory (NASA), California Institute of Technology, Pasadena, CA

Conducted experimental and analytical investigations in the area of fluid mechanics, heat transfer, and acoustics (NASA, Navy and Army Projects); developed an acoustic steam flow meter for DOE (Office of Industrial Program)

RECORD OF RESEARCH FUNDING

Funded Research Proposals:

" Heat Transfer Study with Non-Newtonian Fluids"
Principal Investigator
Funding Agency: Drexel University
(9/85-8/86)

" Experimental Feasibility Study of Falling Ball Viscometer "
Principal Investigator
Funding Agency: Advanced Technology Center of Southeastern Pennsylvania
(12/85-12/86)

"Rheology of Coal-Water Slurry"
Principal Investigator
Funding Agency: Department of Energy, Argonne National Laboratory
(6/87-9/87)

"Heat Transfer Study with Non-Newtonian Fluids in an Abrupt Expansion Pipe Section "
Principal Investigator
Funding Agency: National Science Foundation
(7/87-12/89)

" Separation of Intact, Chromosome-Size DNA Molecules"
Co-Principal Investigator
Funding Agency: NASA, Microgravity Science Office
(9/88-12/94)

"Development of Advanced Low-Temperature Fluids"
Principal Investigator
Funding Agency: Department of Energy, Office of Buildings and Community Systems
(4/89-8/92)

"Heat Transfer in Separated Flows"
Co-Principal Investigator
Funding Agency: Institute of Aeronautics and Astronautics, Taiwan
(9/88-8/91)

"Contrast in Magnetic Resonance Angiography"
Principal Investigator
Funding Agency: Whitaker Foundation through Jefferson University Hospital
(11/90-10/92)

"Non-Newtonian Flow and Heat Transfer in Rectangular Duct"
Principal Investigator
Funding Agency: General Electric
(1/91-12/92)

"Optimization of wash pressure in industrial washer design"
Principal Investigator
Funding Agency: Ben Franklin Partnership
(9/92-12/93)

"Performance study of Water treatment technology"
Principal Investigator
Funding Agency: Ben Franklin Partnership
(9/93-8/96)

"New design tools for advanced infant incubators"
Principal Investigator
Funding Agency: Ben Franklin Partnership
(1/94-8/95)

“Development of electronic descaling technology”
Principal Investigator
ED 2000, Inc.
(7/96-8/00)

“Performance Evaluation of Viscometer”
Principal Investigator
Visco Technologies, Inc.
(4/99-8/02)

“Efficiency of non-chemical water treatments in controlling calcium scale accumulation in recirculating open cooling water system”
Principal Investigator
ASHRAE Research Project 1155-TRP
(9/00-5/02)

"Gas Fuel Conversion by Using Non-Equilibrium Plasma Discharges",
Co-Principal Investigator, Chevron/Texaco
(2004-2005) $90,000

"Use of Low-Temperature Plasma for the Prevention of Fouling in Re-circulating Cooling Tower Water"
Principal Investigator , DOE
(2006-present) $500,000

" Application of pulse spark discharges for scale prevention and continuous filtration methods in coal-fired power plant"
Principal Investigator , DOE
(2008-2011) $1,004,000

Editor

Editor, Handbook of Heat Transfer (Third Edition) (from 1998 to Present) McGraw-Hill, New York

Editor, Advances in Heat Transfer, Volume 37, Academic Press (Elsevier), 2003
Editor, Advances in Heat Transfer, Volume 38, Academic Press (Elsevier), 2004
Editor, Advances in Heat Transfer, Volume 39, Academic Press (Elsevier), 2005
Editor, Advances in Heat Transfer, Volume 40, Academic Press (Elsevier), 2007
Editor, Advances in Heat Transfer, Volume 40, Academic Press (Elsevier), 2008
Editor, Advances in Heat Transfer, Volume 41, Academic Press (Elsevier), 2009
Editor, Advances in Heat Transfer, Volume 42, Academic Press (Elsevier), 2010
Editor, Advances in Heat Transfer, Volume 43, Academic Press (Elsevier), 2011

Editor, Heat Transfer in Asian Research, Volume 32, Wiley, 2003
Editor, Heat Transfer in Asian Research, Volume 33, Wiley, 2004
Editor, Heat Transfer in Asian Research, Volume 34, Wiley, 2005
Editor, Heat Transfer in Asian Research, Volume 35, Wiley, 2006
Editor, Heat Transfer in Asian Research, Volume 36, Wiley, 2007
Editor, Heat Transfer in Asian Research, Volume 37, Wiley, 2008
Editor, Heat Transfer in Asian Research, Volume 38, Wiley, 2009
Editor, Heat Transfer in Asian Research, Volume 39, Wiley, 2010
Editor, Heat Transfer in Asian Research, Volume 40, Wiley, 2011

PUBLICATIONS

ANTI-FOULING TECHNOLOGY FOR HEAT EXCHANGERS

Y.I. Cho and S.M. Cho, Heat Exchange Technology, Kirk-Other Encyclopedia of Chemical Technology, 4th ed., Vol. 12, pp.950-990, (1994).

E. Choi and Y.I. Cho, Local friction and heat transfer behavior of water in a turbulent pipe flow with a large heat flux at the wall, ASME Trans., J. Heat Transfer, Vol.117, pp.533-539, (1995).

In Gyu Park, B.C.Pak, and Y.I.Cho, A Numerical Study of Impingment Heat Transfer in a Confined Circular Jet, KSME International Journal, Vol.11, No.3, pp.348-358, 1997.

Chunfu Fan and Y.I. Cho, A new electronic descaling method to control precipitation fouling, submitted to the 1997 National Heat Transfer Conference, Baltimore, August, 1997.

Y.I. Cho, Chunfu Fan and Byung-Gap Choi, Theory of Electronic Descaling Technology of Control Precipitation Fouling in Heat Exchangers, Int. Comm. Heat Mass Transfer, Vol.24, 747-756, 1997.

Chunfu Fan and Y.I. Cho, Microscopic observation of calcium carbonate crystallization induced by an electronic descaling technology, Int. Comm. Heat Mass Transfer, Vol.24, 757-770, 1997.

Y.I. Cho, Byung-Gap Choi, and Bennat J. Drazner, Use of Electronic Descaling Technology to Control Precipitation Fouling in Plate-and-Frame Heat Exchangers, " Compact Heat Exchangers for the Process Industries, (edited by R.K.Shah) pp.267-273, Begell House, New York, 1997.

Y. I. Cho, Byung-Gap Choi, and Bennat J. Drazner, Electronic Anti-Fouling Technology to Mitigate Precipitation Fouling in Plate-and-Frame Heat Exchangers, Int. J. Heat Mass Transfer Vol.41, pp.2565-2571, 1998.

Y. I. Cho, Chunfu Fan and Byung-Gap Choi, Use of Electronic Anti-Fouling Technology with Filtration to Prevent Fouling in a Heat Exchanger, Int. J. Heat Mass Transfer, Vol.41, pp.2961-2966, 1998.

Y. I. Cho and Byung-Gap Choi, Effect of Fouling on Temperature Measurement Error and a Solution, Journal of Heat Transfer, Vol.120, pp.525-528, 1998.

Y. I. Cho and Byung-Gap Choi,Validation of an Electronic Anti-Fouling Technology in a Single-Tube Heat Exchanger, International Journal of Heat and Mass Transfer, Vol.42, pp.1491-1499, 1999.

Y. I. Cho and Byung-Gap Choi, Experimental Validation of Electronic Anti-Fouling Technology with a Plate Heat Exchanger, Proceedings of 11th IHTC, Vol.6, pp. 197-201, Kyungju, Korea.

Rong Liu and Y.I. Cho, Combined Use of an Electronic Antifouling Technology and Brush Punching for Scale Removal in a Water-Cooled Plain Tube, Experimental Heat Transfer, Vol.12, pp.203-213, 1999.

Y.I. Cho and Rong Liu, Control of fouling in a spirally-ribbed water chilled tube with electronic anti-fouling technology, Int. J. Heat Mass Transfer, Vol. 42, pp.3037-3046, 1999.

Y.I. Cho and W.T. Taylor, An innovative electronic descaling technology for scale prevention in a chiller, Ashrae Transaction: Symposia Vol. 105, Part 2, SE-99-3-1, pp. 581-586, 1999.

W.T.Kim and Y.I.Cho, Experimental study of the crystal growth behavior of $CaCO_3$ fouling using a microscope, Experimental heat Transfer, 13: 153-161, 2000

Y.I. Cho, R. Liu, W.J. McFarland, and L. Fusegni, Study of scale-removal methods in a double-pipe heat exchanger, Heat Transfer Engineering, 21:50-57, 2000

S.H.Lee, Y.I.Cho, C. Bai, D.J.Cho, The effect of aspect ratio on turbulent flow heat transfer and pressure drop in a plate heat exchanger, Int Journal of Heat Exchangers, 1: 113-124, 2000.

W.T.Kim, Y.I.Cho, and C. Bai, Effect of electronic anti-fouling treatment on fouling mitigation with circulating cooling tower water, International Communications in Heat and Mass Transfer, 28: 671-680, 2001

W.T.Kim, C. Bai, and Y.I.Cho, A study of fouling with a microscopic imaging technique, International Journal of Heat and Mass Transfer, 45: 597-607, 2002.

W.T.Kim and Y.I.Cho, A study of scale formation around air bubble attached on a heat transfer surface, Int. Comm. Heat Mass Transfer, 29: 1-14, 2002.

S.H. Lee and Y.I. Cho, Velocity effect on electronic-antifouling technology to mitigate mineral fouling in enhanced-tube heat exchanger, Int Journal of Heat Mass Transfer, 45: 4163-4174, 2002.

SungHyuk Lee and Young I Cho, Study of the performance of physical water treatment with a solenoid coil to prevent mineral fouling Part 1: Effect of a side-stream filtration, Int. Comm. Heat Mass transfer, Vol. 29, pp.145-156, 2002

SungHyuk Lee and Young I Cho, Study of the performance of physical water treatment with a solenoid coil to prevent mineral fouling Part 2: Effect of air bubbles, Int. Comm. Heat Mass transfer, Vol. 29, pp.157-163, 2002

Young I Cho , SungHyuk Lee, Wontae Kim, and Sangho Suh, Physical Water Treatment for the Mitigation of Mineral Fouling in Cooling-Tower Water Applications, Fouling in Heat Exchanger Conference, Santa Fe, New Mexico, May 2003

Y.I. Cho, S.H. Lee and W. Kim, Physical water treatment for the mitigation of mineral fouling in cooling-tower water applications, Ashrae Transactions, Vol.109, Part 1, pp.346-357, 2003. Also presented at Ashrae Meeting at Chicago, Jan. 2003.

Chiranjeev S. Kalra, Mikhail Kossitsyn, Kamilla Iskenderova, Alexandre Chirokov, Young I. Cho, Alexander Gutsol, Alexander Fridman, Electrical discharges in the Reverse Vortex Flow – Tornado Discharges, ISPC 16, Taormina, Italy, June 22-27, 2003

C. S. Kalra, Y. I. Cho, A. Gutsol, A. Fridman, T. S. Rufael, V. A. Deshpande, “Plasma Catalytic Conversion of Methane in Ultra Rich Flame using Transient Gliding Arc Combustion Support ”.

– Electronic Proceedings of 2004 Technical Meeting, Central States Section, The Combustion Institute, 21-23 March 2004, University of Texas at Austin, Texas. A35.pdf

Young I. Cho, Sung-Hyuk Lee, Wontae Kim, and Sangho Suh, Physical water treatment for the mitigation of mineral fouling, Int. J. Transport Phenomena, Vol. 6, pp.1-6, 2004.

Y. Cho, A. Fridman, W. Kim and S. Lee, Physical Water Treatment for fouling prevention in heat exchangers, Advances in Heat Transfer, Academic Press, Vol.38, pp.1-72, 2004.

John Lane, Y.I. Cho and W.T. Kim, Pulsed power water treatment as a green scale inhibitor for HVAC and once-through industrial systems, NACE Paper number 04541, Corrosion-2004 International Conference, 2004.

C. S. Kalra, Y. I. Cho, A. Gutsol, A. Fridman, T. S. Rufael, "Gliding arc in tornado using a reverse vortex flow". Review of Scientific Instruments, **76**, 025110 (2005)

Young I. Cho and Sung-Hyuk Lee, Reduction in the Surface Tension of Water due to Physical Water Treatment for Fouling Control in Heat Exchangers, Int. Comm. Heat Mass Transfer, Vol.32, pp.1-9, 2005.

4. T Israeli, A Reddy, Y.I. Cho, Investigation on the use of nanofluids to enhance heat pipe performance, ISEC2005-76247, International Solar Energy Conference, Orlando, FL

Shon CH, Kim CS, Moon SY, Cho YI, Effect of longitudinally positioned solenoid coil on electronic descaling, Int. Comm. Heat Mass Transfer, Vol. 32, pp.240-247, 2005

Y. Cho, J. Lane, and W.T. Kim., Pulsed-power treatment for physical water treatment, Int. Comm. Heat Mass Transfer, Vol. 32, pp.861-871 2005

MY Jung, CS Kim, LD Tijing, BC Pak, YI Cho, A study of the onset of biofouling using quartz crystal nanobalance, Int. Comm. Heat Mass Transfer, Vol. 33, pp.7-13, Jan. 2006.

GJ Lee, LD Tijing, BC Pak, BJ Baek, YI Cho, Use of catalytic materials for the mitigation of mineral fouling, Int. Comm. Heat Mass Transfer, Vol. 33, 14-23, Jan. 2006.

Y. I. Cho, Won Tae Kim and Daniel J. Cho, Electro-flocculation mechanism of physical water tr eatment for the mitigation of mineral fouling in heat exchangers, Experimental Heat Transfer, V olume 20 Issue 4, 323-335, 2007

Leonard D. Tijing, BC Pak, B.J. Baek, and Dong Hwan Lee**,** Y.I. Cho, An experimental study on the bulk precipitation mechanism of physical water treatment for the mitigation of mineral fouli ng, Int. Comm. Heat Mass Transfer, 2007, 34, pp.673-681.

YI Cho, A Fridman, A Gutsol, Non-thermal plasma for air and water treatments, Advances in H eat Transfer, Elsevier, Vol.40, 1-112, 2007

Cho YI and McLachlan, Physical Water Treatment for Cooling Towers, Cooling Technology Ins

titute Annual Conference, Houston TX Feb 4-7, 2008, Paper No. TP08-15

Leonard D. Tijing, BC Pak and Dong Hwan Lee, Y.I. Cho, Heat-treated titanium balls for the mi tigation of mineral fouling in heat exchangers, Experimental Heat Transfer, Volume 21 Issue 2, pp. 115-132, 2008

Yong Yang, Jinhan Zhu, Young I. Cho, Alexander Gutsol, Alexander Fridman, Model for Development of Electric Breakdown in Liquids and Stability Analysis 35th IEEE International Conference on Plasma Science, Karlsruhe, Germany, 2008

Leonard D. Tijing, H. Y. Kim and Dong Hwan Lee, C. S. Kim, Y.I. Cho, Use of an Oscillating Electric Field to Mitigate Mineral Fouling in a Heat Exchanger, Experimental Heat Transfer, Volume 22 Issue 4, pp. 257-270, 2009

Yong Yang, Alexander Gutsol, Alexander Fridman, Young I. Cho, Removal of CaCO3 scales on a filter membrane using plasma discharge in water, International Journal of Heat and Mass Tran sfer, 52 (2009) 4901–4906

Yong Yang, Hyoungsup Kim, Alexander Fridman, Young I. Cho, Effect of a plasma-assisted self-cleaning filter on the performance of PWT coil 3 for the mitigation of mineral fouling in a heat exchanger, International Journal of Heat and Mass Transfer, 53 (2010) 412–422

Moogega Cooper, , Gregory Fridman, David Staack,Alexander F. Gutsol, Victor N. Vasilets, Shivanthi Anandan, Young I. Cho,Alexander Fridman, and Alexandre Tsapin, Decontamination of Surfaces From Extremophile Organisms Using Nonthermal Atmospheric-Pressure Plasmas, IEEE Trans. On Plasma Sci., 37, 2009 866-871

L. D. Tijing, H. Y. Kim, D. H. Lee, C. S. Kim,and Y. I. Cho, MITIGATION OF CALCIUM CARBONATE FOULING USING AN OSCILLATING ELECTRIC FIELD, Heat Exchanger Fouling and Cleaning 2009, June 14-19, 2009 Schladming, Austria

Y. Yang, H. Kim, A. Starikovskiy, A. Fridman, Y. Cho, Application of pulsed spark discharge for calcium carbonate precipitation in hard water, Water Research 44, 2010, 3659-3668

L. D. Tijing, H. Y. Kim, D. H. Lee, C. S. Kim, and Y. I. Cho, Physical water treatment using RF electric fields for the mitigation of $CaCO_3$ fouling in cooling water, International Journal of Heat and Mass Transfer, 53 (2010) 1426-1437.

PLASMA WATER TREATMENT

A. Starikovskiy, Y. Yang, Y. Cho, A. Fridman, Nonequilibrium liquid plasma generation, IEEE Transactions on Plasma Science (accepted)

A. Starikovskiy, Y. Yang, Y. Cho, A. Fridman, Non-equilibrium plasma in liquid water: dynamics of generation and quenching, Plasma Sources Science and Technology (accepted, expect publish online in April, 2011)

Y. Yang, H. Kim, A. Starikovskiy, A. Fridman, Y. Cho, Pulsed multichannel discharge array in water with stacked circular disk electrodes, IEEE Transactions on Plasma Science (accepted, expect publish online in August, 2011)

Y. Yang, H. Kim, A. Starikovskiy, Y. Cho, A. Fridman, Mechanism of calcium ions precipitation from hard water using pulsed spark discharges, Plasma Chemistry and Plasma Processing, 31, 2011, 51-66

Y. Yang, H. Kim, A. Starikovskiy, A. Fridman, Y. Cho, Mineral fouling control by underwater pulsed spark discharge in a heat exchanger, ASME Journal of Heat Transfer, 2011, 133, 054502(1-4)

Y. Yang, A. Fridman, Y. Cho, Plasma discharge in water, Advances in Heat Transfer, 42, 2011, 179-292

Y. Yang, A. Starikovskiy, A. Fridman, Y. Cho, Analysis of streamer propagation for electric breakdown in liquid, Plasma Medicine, 1, 2010, 65-83

Y. Yang, H. Kim, A. Starikovskiy, A. Fridman, Y. Cho, Application of pulsed spark discharge for calcium carbonate precipitation in hard water, Water Research, 44, 2010, 3659-3668

Y. Yang, H. Kim, A. Fridman, Y. Cho, Effect of a plasma-assisted self-cleaning filter on the performance of PWT coil for the mitigation of mineral fouling in a heat exchanger, International Journal of Heat Mass Transfer, 53, 2010, 412-422

Y. Yang, A. Gutsol, A. Fridman, Y. Cho, Removal of CaCO3 scales on a filter membrane using plasma discharge in water, International Journal of Heat Mass Transfer, 52, 2009, 4901–4906

BIOFLUIDS

Y.I. Cho and L.H. Back and D.W. Crawford, "Pressure Difference-Flow Rate Variation in a Femoral Artery Branch Casting of Man for Steady Flow", ASME Transaction Journal of Biomechanical Engineering, Vol.105, pp.258-262, (1983).

Y.I. Cho, L. H. Back, D.W. Crawford and R. F. Cuffel, "Experimental Study of Pulsatile and Steady Flow Through a Smooth Tube and an Atherosclerotic Coronary Artery Casting of Man", Journal of Biomechanics, Vol.16, pp.933-946 (1983).

Y.I. Cho and L.H. Back, "A Study of Flow Separation in a Femoral Artery Branch Casting of Man for Steady Flow", Proc. of the 36th ACEMB, Paper No. 25.3 p. 118, Columbus, Ohio, 1983.

Y.I. Cho and L. H. Back,"Reynolds Number Effects on the Local Pressure Rise in 30 and 60 Degree Arterial Branch Models for Steady Flow," 1983 Advances in Bioengineering, pp. 54-55, ASME WAM held at Boston, MA, November, l983.

Y.I. Cho and L.H. Back, "In Vitro Flow Measurements in Ion-Sputtered Hydrocephalus Shunts", Proc of the 36th ACEMB, Paper No. 31.4, p. 152, Columbus, Ohio, 1983.

Y.I. Cho, and L.H. Back, "Pressure Distributions and Flow Separation in an Arterial Branch Model for Steady Flow", Proceedings of the 1983 ASME Biomechanics Symposium, AMD-Vol. 56,FED-Vol.l pp.171-174, June 1983.

L. H. Back, Y.I. Cho, D.W. Crawford and R. F. Cuffel, "Effect of Mild Atherosclerosis on Flow Resistance in a Coronary Artery Casting of Man", ASME Transaction Journal of Biomechanical Engineering, Vol.106, pp.48-53, (1984).

Y.I. Cho, L.H. Back, D.W. Crawford and D.H. Blankenhorn, "Curvature Effect in a Femoral Artery Flow Model of Man", Proc. of the 37th ACEMB, Paper No. 7.5, p. 46, Los Angeles, CA. 1984.

Y.I. Cho, L.H. Back, and D.W. Crawford, "Effect of Simulated Hyperemia on the Flow Field in a Mildly Atherosclerotic Coronary Artery Casting of Man," Aviation, Space and Environmental Medicine (Aerospace Medical Society Journal), Vol.56, pp.212 -219 (1985).

M.R. Back, Y.I. Cho, and L.H. Back, "Fluid Dynamic Study in a Femoral Artery Branch Casting of Man with Upstream Main Lumen Curvature for Steady Flow," ASME Transaction Journal of Biomechanical Engineering, Vol.107, pp. 240-248, (1985).

Y.I. Cho, L.H. Back, and D.W. Crawford, "Experimental Investigation of Branch Flow Ratio, Angle, and Reynolds Number on the Pressure and Flow Fields in Arterial Branch Models," ASME Transaction Journal of Biomechanical Engineering, Vol.107, pp.257-267, (1985).

L.H. Back, J.R. Radbill, Y.I. Cho, and D.W. Crawford, "Measurement and Prediction of Flow through an Axisymmetric Replica of a Mildly Atherosclerotic Coronary Artery of Man," Journal of Biomechanics, Vol.19, pp.1-17,(1986).

L.H. Back, Y.I. Cho and D.W. Crawford, "Phasic and Spatial Pressure Measurements in a Femoral Artery Branch Model for Pulsatile Flow", ASME Transaction, Journal of Biomechanical Engineering, Vol.108. pp 251-258, (1986).

M.R. Back, Y. I. Cho, D.W. Crawford and L.H. Back," Fluid Particle Motion and Lagrangian Velocities for Pulsatile Flow through a Femoral Artery Branch Model" ASME Transaction, Journal of Biomechanical Engineering, Vol.109, pp.94-101 (1987).

L.H. Back, Y.I. Cho, D.W. Crawford and D.H.Blankenhorn, "Flow Resistance in Curved Femoral Artery Models of Man for Steady Flow", ASME Transaction, Journal of Biomechanical Engineering, Vol.109, pp.90-93 (1987).

Y.I. Cho, Numerical Studies of Arterial Branch Flows with Tapered or Bent Downstream Main Lumen, ASME 1988 Advances in Bioengineering, BED-Vol.8, (edited by G.R.Miller), pp.31-34, 1988.

Y.I. Cho and L.H. Back, In Vivo Flow Measurements in Ion Sputtered Hydrocephalus Shunts, J. Biomechanics, Vol.22, pp.335-342 (1989).

Y.I. Cho, Hemodynamics of Arterial Flows, Proceedings of the US-Korea Fluid Engineering Engineering:Korea-U.S. Progress" ed. by J.H.Kim, Hemisphere, pp. 591-606, New York, 1991.

Y.I. Cho and K. Kensey, Effects of the Non-Newtonian Viscosity of Blood on Hemodynamics of Diseased Arterial Flows, presented at the 1989 Winter Annual Meeting, San Francisco, December, 1989: published in the 1989 Advances in Bioengineering, 1989; BED-VOL. 15: 147-148.

Y.I. Cho and K. Kensey, The Bolus Theory for the Etiology of Atherosclerosis, Proceedings of the First World Congress of Biomechanics, Vol. 2, p. 360, San Diego, CA, September 1-4, 1990.

Y.I. Cho, C. Gonzalez, H.V. Ortega, and Moret, Flow Analysis of the Origin and Progression of Intracranial Aneurysm, presented at the 28th Annual Meeting of the American Society of NeuroRadiology, March, 1990, Los Angeles.

C. Gonzalez, Y.I. Cho, H.V. Ortega, and J. Moret, Modeling of the Flow Changes Produced by Balloon Occlusion of Intracranial Aneurysm, presented at the 28th Annual Meeting of the American Society of NeuroRadiology, March, 1990, Los Angeles.

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Y.I. Cho,B.C.Pak, and E. Choi, A New Convective Heat Transfer Enhancement Technique with Phase Change Materials, presented at the 1990 Pan-Korean Engineering Conference, held at Seoul, July, 1990.

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W.K. Gingrich and Y.I. Cho, The roles of shear thinning and viscous dissipation in the flow and heat transfer of an inelastic fluid through a nonuniformly heated rectangular duct, presented at the 1991 ASME National Heat Transfer Conference, Minneapolis, MN (July 28-31, 1991).

Y.I. Cho, Eunsoo Choi, and Harold G. Lorsch, Enhancement of Heat Transfer with a Low-Temperature Advanced Fluid for Cooling District Systems, presented at the International Symposium on Fluid for District Heating, held at Copenhagen, April 10-11, 1991.

Y.I. Cho, E.N. Ganic, J.P. Hartnett, and W.M. Rohsenow, Basic Concepts of Heat Transfer, Handbook of Heat Transfer (3rd. ed.), McGraw Hill, New York, 1998.

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Books and Journals Edited

Advances in Heat Transfer with J.P. Hartnett, T.F. Irvine, Jr., and G. Green (Vols. 21-41, Academic Press)
Handbook of Heat Transfer with J.P. Hartnett, and W.M. Rohsenow (third edition, McGraw Hill, 1998)

Patents (35 U.S. Patents and 4 Korean patents awarded)

Graduate Students Supervised (or co-supervised):

Name	Degree, Date	Research Topic

1. Fu, Paul	M.S., 6, 1987	Rheology of Viscoelastic Fluids
2. Pak, B.C.	Ph.D., 9, 1989	Heat Transfer in Sudden Expansion Pipe
3. Frank Jones	Ph.D., 12, 1991	On the Sampling of Suspensions in Laminar Flow
4. Mike Nispel	M.S. , 6, 1992	Biofluid Dynamics in Bifurcation
5. Chee, Daniel	Ph.D., 3,1993	Laser Induced Fluorescence Spectroscopy
6. Rupak Banerjee	Ph.D., 1,1993	Hemodynamics in Stenosed Artery
7. Eunsoo Choi	Ph.D., 6,1993	Exp. Heat Transfer with Phase Change Materials
8. Sehyun Shin	Ph.D., 8,1993	Exp. Heat Transfer in Rectangular Duct
9. Steve Choi	M.S., 3, 1993	Manifold design study
10. William K. Gingrich		Ph.D. 6, 1993 Heat Transfer in Rectangular Duct
11.Wei-Lin Cho	Ph.D., 6, 1994	Mechanical energy absorber
12. In-Kyu Park	M.S. 8, 1994	Heat transfer in impinging jet
13. Chunfu Fan	Ph.D., 3, 1997	Study of Electronic Descaling Technology
14. Byungap Choi	Ph.D. 6, 1998	Study of Fouling in Heat Exchangers
15. Rong Liu	Ph.D. 12, 1999	Study of Fouling in Heat Exchangers
16. Won Tae Kim	Ph.D. 5, 2001	Physical water treatment technology
17. Sung Hyuk Lee	Ph.D. 6, 2002	Fouling in heat exchangers
18. SangHo Kim	Ph.D. 12, 2003	Hemorheology and vascular diseases
19. Change Beom Kim	Ph.D. 8, 2006	Blood Rheology
20. Shailesh Gangoli	Ph.D. 9, 2007	Warm plasmas and their applications
21. Leonard Tijing	Ph.D. 8, 2008	Physical water treatment to mitigate fouling
22. Yong Yang	Ph.D. 12, 2009	Plasma application on water treatment

SERVICE TO MEM DEPARTMENT

Graduate Committee (1988-1989, 1990-1993) (1998-present)
Undergraduate Curriculum Comm (2004-2007)
Thermo-fluid science area adviser (1998-2002)
Tenure and Promotion Committee (Chair, 2001-2003, 2004)
Promotion Committee (1988-2004)
Enrollment Committee (1998-2002)
Budget Planning and Development Committee (1999)
Laboratory Committee (Chairmen:1987-88, 1989 - 1995)
produced a five-year laboratory improvement plan together with committee members
prepared the five-year plan for 1989 ABET evaluation
Recruiting Committee (Chairman, 1991-92, 1997, 1998)
Academic Standing Committee (1986-1988)

REVIEWED PAPERS AND PROPOSALS FOR THE FOLLOWING AGENCIES AND ORGANIZATIONS

National Science Foundation

ASME Applied Mechanics Reviews,
ASME Journal of Biomechanical Engineering,
ASME Journal of Heat Transfer
Journal of Biomechanics,
International Journal of Heat and Mass Transfer,
AIChE Journal,
Chemical Engineering Communications,
Journal of Electrochemical Society
International Journal of Heat and Mass Transfer
Biotechnology and Bioengineering (Wiley)
Annals of Biomedical Engineering
Applied Thermal Engineering
Industrial & Engineering Chemistry Research

U.S. Department of Energy
Heat Transfer Engineering
Journal of Enhanced Heat Transfer

PROFESSIONAL AFFILIATIONS

American Society of Mechanical Engineers (Fellow)
ASHRAE, Member
Korean-American Scientists and Engineers Association
Korean Society of Mechanical Engineers
Honorary Editorial Advisory Board, International Journal of Heat and Mass Transfer
Honorary Editorial Advisory Board, International Communications in Heat and Mass Transfer

ASME Committee Activities
Fluid Mechanics Committee, Member
Bioengineering Division, Fluid Mechanics Committee, Member
K-10 Heat Transfer Committee, member

Consulting Activities
DOE's Argonne National Laboratory, Argonne, IL,
NASA's Jet Propulsion Laboratory, Pasadena, CA,
UNYSIS, Bluebell, PA,
Honeywell Defense System, Horsham, PA,
Duracell Inc., Needham, MA,
Saft America,
Kensey Nash Corporation, Exton, PA
Visco Technologies, Inc.
ED 2000, Inc.
Rheologics, Inc.

Patents

US5670041 Reduced corrosion electronic descaling technology 1997-09-23
US5725778 Current driver for electronic descaling 1998-03-10
US5776334 Electronic scale reduction technique 1998-07-07
US5846414 Electronic scale reduction by eccentrically positioned coils 1998-12-08
US5916490 Humidifier and means for removing calcium carbonate from water 1999-06-29
US5951856 Water hardness reduction through interactive molecular agitation and filtration 1999-09-14
US6250086 High efficiency refrigeration system 2001-06-26
US6292085 Multiple coil assembly for use with electronic descaling unit 2001-09-18
US6293108 Regenerative refrigeration system with mixed refrigerants 2001-09-25
US6322524 Dual riser/single capillary viscometer 2001-11-27
US6322525 Method of analyzing data from a circulating blood viscometer for determining absolute and effective blood viscosity 2001-11-27
US6389818 Method and apparatus for increasing the efficiency of a refrigeration system 2002-05-21
US6402703 Dual riser/single capillary viscometer 2002-06-11
US6412336 Single riser/single capillary blood viscometer using mass detection or column height detection 2002-07-02
US6425249 High efficiency refrigeration system 2002-07-30
US6428488 Dual riser/dual capillary viscometer for newtonian and non-newtonian fluids 2002-08-06
US6430937 Vortex generator to recover performance loss of a refrigeration system 2002-08-13
US6449964 Regenerative refrigeration system with mixed refrigerants 2002-09-17
US6450974 Method of isolating surface tension and yield stress in viscosity measurements 2002-09-17
US6484565 Single riser/single capillary viscometer using mass detection or column height detection 2002-11-26
US6494935 Vortex generator 2002-12-17
US6523396 Single riser/single capillary viscometer using mass detection or column height detection 2003-02-25
US6564618 Electrorheological and magnetorheological fluid scanning rheometer 2003-05-20
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US6598465 Electrorheological and magnetorheological fluid scanning rheometer 2003-07-29
US6624435 Dual riser/dual capillary viscometer for newtonian and non-newtonian fluids 2003-09-23
US6651451 Variable capacity refrigeration system with a single-frequency compressor 2003-11-25
US6662576 Refrigeration system with de-superheating bypass 2003-12-16

US6672084 Energy saving refrigeration system using composition control with mixed refrigerants 2004-01-06
US6692437 Method for determining the viscosity of an adulterated blood sample over plural shear rates 2004-02-17
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US6732573 Single riser/single capillary blood viscometer using mass detection or column height detection 2004-05-11
US6745615 Dual riser/single capillary viscometer 2004-06-08
US6907772 Dual riser/single capillary viscometer 2005-06-21
US7244360 Water treatment process 2007-07-17
특허등록
1. 박복춘, 김철생, 조영일, “수처리용 촉매 및 이를 이용한 수처리 장치”, 등록번호 : 제 0589516 호, 2006. 06.07
2. 박복춘, 김철생, 조영일, “수처리 방법 및 냉각수 장치”, 등록번호 : 제 0716303 호, 2007.05.02
3. 박복춘, 조영일, 신명선, 김철생, 이동환, “혈액의 헤마토크리트 측정장치 및 방법”, 등록번호: 0829928 호, 2008.05.08
4. 박복춘, 조영일, 신명선, 김철생, 이동환, “혈액의 혈전형성율 측정장치 및 방법”, 등록번호: 0829932 호, 2008.05.08