

Curriculum Vitae

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EDUCATION:

- 2003 Ph.D. in Mechanical Engineering
Department of Mechanical Engineering, University of Kentucky
Lexington, KY 40506
- 1989 M.S. in Refrigeration and Cryogenics
Department of Energy Engineering, Zhejiang University
Hangzhou, Zhejiang, China
- 1985 B.S. in Refrigeration and Cryogenics
Department of Energy Engineering, Zhejiang University
Hangzhou, Zhejiang, China

PROFESSIONAL EXPERIENCE:

- July 2018 – present **Professor and Founding Director of BME program**
Department of Physics and Engineering, West Chester University of
Pennsylvania, West Chester, PA 19383
- 2011 – 2018 **Associate Professor and Department Chair**
Department of Biomedical Engineering, Widener University, Chester, PA
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- 2010 – 2011 **Associate Professor (with Tenure)**
Department of Mechanical Engineering, Widener University, Chester, PA
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- 2004 – 2010 **Assistant Professor**
Department of Mechanical Engineering, Widener University Chester, PA
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RESEARCH AREAS:

1. **Artificial Kidney/ Hemodialysis**

- a) Development of wearable artificial kidney; study of novel annular ring technique to evaluate local solute clearance for dialyzers; evaluation of the influence of operational conditions on solute clearance; investigation of the effects of dialyzer reprocessing on solute clearance; prevention of potential bacterial products back transfer.
- b) Development of novel approaches to enhance the treatment for renal patients including: pre vs. post dilution model, different ultrafiltration rate applied in pre-dilution

model in high volume continuous hemofiltration, determinants of solute clearance in hemodiafiltration (HDF), and study of a dual cartridge hemodialysis system.

- c) Development of novel technologies to fabricate nano-porous ceramic membrane hemodialyzers for use in artificial kidney.

2. **Cryogenics**

Cryogenic grinding technology for rubber, plastic, pigment size reduction, and traditional Chinese herbal medicine; cryo-refrigeration; gas (nitrogen, oxygen, helium, hydrogen) liquefaction separation; cell cryo-preservation

3. **Refrigeration technology**

Freeze drying technology for food, royal bee jelly; freeze drying for biomaterial; heat pump with rare earth hydrides; air conditioning system; cooling device to minimize ischemic brain injury during surgical procedures

PATENTS:

1. Apparatus and Method for Enhanced Hemodialysis Performance, US 2007/0119781 A1, May 31, 2007
2. Cryogenic grinding for Chinese Herbal Medicine. Patent Number: 91202211.6 China, 1992

PUBLICATIONS:

(A) Journal Papers (Refereed)

1. Li, W., Liu, J., He, L., Liu, J., Sun, S., Huang, Z., Liang, X., Gao, D., Ding, W., Simulation and Experimental Study on the Effect of Channeling Flows on the Transport of Toxin in Hemodialyzers, *Journal of Membrane Science*, 501:123-133, 2016.
2. Liang, X.M., Sekar, P.K., Zhao, G., Zhou, X., Shu, Z., Huang, Z., Ding, W., Zhang, Q., Gao, D. High accuracy thermal conductivity measurement of aqueous cryoprotective agents and semi-rigid biological tissues using a microfabricated thermal sensor. *Scientific Reports*, 5:10377. doi: 10.1038/srep10377, 2015.
3. Wu, P., J. Yi, G. Zhao, Z. Huang, B. Qiu and D. Gao. Active contour-based cell segmentation during freezing and its application in cryopreservation. *IEEE Trans Biomed Eng*, 62(1): 284-295, 2015.
4. Gashti, C.N., Rodby, A. Huang, Z., Gao, D., Zhang, W., Effects of High Blood Flow and High Pre-Dilution Replacement Fluid Rates on Small Solute Clearances in Hemofiltration, *Blood Purif*, 2011;32(4): 266-270
5. Attaluri, A.C., Huang, Z., Zhu, L., Evaluation of an interstitial cooling device for carotid arterial cooling using a tissue equivalent gel phantom, *Journal of Thermal Science and Engineering Applications*, 2010, 2(1): 011007 – 011012
6. Huang, Z., Gao, D., Letteri, J.J., Clark, W.R., Blood–Membrane Interactions During Dialysis, *Seminar in Dialysis*, 2009, 22(6): 623 - 628
7. Attaluri, A.C., Huang, Z., Belwalkar, A., Van Geertruyden, W., Gao, D., Misiolek, W., Evaluation of Nano-Porous Alumina Membranes for Hemodialysis Application, *ASAIO Journal*, 2009, 55(3):

8. Huang, Z., Letteri, J.J., Clark, W.R., Ronco, C., Gao, D., Operational characteristics of continuous renal replacement modalities used for critically ill patients with acute kidney injury, *The International Journal of Artificial Organs*, 2008, 31(6): 525-534
9. Belwalkar, A. Grasing, E. Van Geertruyden, W. Huang, Z. Misiolek, W.Z., Effect of Processing Parameters on Pore Structure and Thickness of Anodic Aluminum Oxide (AAO) Tubular membranes, *Journal of Membrane Science*, 2008, 319 (1): 192-198
10. Huang, Z., Letteri, J.J., Clark, W.R., Zhang, W., Gao, D., Ronco C., Ultrafiltration Rate as a Dose Surrogate in Pre-Dilution Hemofiltration, *The International Journal of Artificial Organs*, 2007, 30(2): 2 – 10
11. Labib, M., Murawski, J., Tabani, Y., Wolff, S., Zydney, A., Funderburk, F., Huang, Z., Kapoian, T., Sherman R., *Water Permeability of High-Flux Dialyzer Membranes after Renalin Reprocessing, Kidney*, International 2007, 71; 1177–1180
12. Huang, Z., Zhang, W., Yu, J., Gao, D., Nanoporous Alumina Membranes for Enhancing Hemodialysis, *Journal of Medical Devices*, 2007, 1: 79 – 83
13. Huang, Z., Clark, WR., Gao, D., Factors Influencing Low-Molecular-Weight Solute Clearance During Hemodialysis, *Hemodialysis International*, 2005, 9 (4): 332 - 337
14. Zhang, W., Huang Z., Yu J., et al, Experiment on the Formation and Characterizations of Anodic Alumina Membrane for Use in Hemodialysis, *Journal of Biomedical Engineering*, 2005;22(5):1007-1010 (In Chinese)
15. Liao, Z., Klein, E., Poh, C., Huang, Z., et al., Measurement of Hollow Fiber Membrane Transport Properties in Hemodialyzers, *Journal of Membrane Science*, 2005, 256: 176–183
16. Huang, Z., Li, B., Zhang, W., et al., Convective Renal Replacement Therapies for Acute Renal Failure and End-Stage Renal Disease, *Hemodialysis International*, 2004; 8: 386-393
17. Zhang W., Huang Z., Gao, D., et al, Effect of Blood Flow Rate on Solute Clearance in High-Dose Pre-Dilution Continuous Venovenous Hemofiltration, *Academic Journal of Shanghai Second Medical University*, 2004,24(10):798-801 (In Chinese)
18. Liao, Z., Klein, E., Poh, C., Huang, Z., et al., A Modified Equivalent Annulus Model for the Hollow Fiber Hemodialyzer, *The International Journal of Artificial Organs*, 2004, 27 (2), 110 - 117
19. Huang, Z., Klein E., Li, B., et al. A New Method to Evaluate the Local Clearance at Different Annular Rings inside Hemodialyzers, *American Society for Artificial Internal Organs (ASAIO) J.*, 2003; 49 (6): 692-697
20. Liao, Z., Poh, C., Huang, Z., Hardy, P., Clark, W., Gao, D., Numerical and Experimental Study of Mass Transfer in the Artificial Kidney, *J. Biomech. Eng.*, 2003; 125: 472-480
21. Poh C., Hardy, P., Liao, Z., Huang, Z., Clark, W., Gao, D., Effect of Flow Baffles on the Dialysate Flow Distribution of Hollow-Fiber Hemodialyzers: A Nonintrusive Experimental Study Using MRI, *J. Biomech. Eng.*, 2003; 125: 480-489
22. Liao, Z., Zhang, W., Poh, C., Huang, Z., Clark, W., et al. *Kinetic Comparison of Different Acute Dialysis Therapies, Artificial Organs*, 2003; 27: 802-806

23. Poh, C., Hardy, P., Liao, Z. Huang, Z., et al. Effect of Spacer Yarns on the Dialysate Flow Distribution of Hemodialyzers: A Magnetic Resonance Imaging Study, *American Society for Artificial Internal Organs (ASAIO) J.*, 2003; 49 (4): 440 – 448
24. Huang, Z., Li, S., Shao, H., The Properties and Potential Application of Slush Hydrogen, *Vacuum & Cryogenics*, 1996; 2 (3): 149 – 152 (in Chinese)
25. Yang, J., Li, S., Huang, Z., New Development of the Pulse Tube Refrigerator, *Vacuum & Cryogenics*, 1996; 2 (3): 153 – 157 (in Chinese)

(B) Book and Book Chapters

1. Zhao, G., Huang, Z., Gao, D., Microdevices for measurement of cell membrane biophysical properties. In: He, X.M., Bischof, J.C. (Eds.), *Multiscale Technologies for Cryomedicine*. World Scientific Publishing Co Pte Ltd, 2016
2. Shu, Z., Heimfeld, S., Huang, Z., Gao, D., Progress in Cryopreservation of Stem Cells and Immune Cells for Cytotherapy, In: Demirer, T. (Ed.). *Progress in Stem Cell Transplantation*, ISBN 978-953-51-2227-2, 23-42, 2015.
3. Huang, Z., Letteri, JJ., Ronco, C., Clark, WR., The Membrane: Size and Material. In: Kellum, J., Bellomo, R., Ronco, C., (Eds). *Handbook of CRRT, 2nd ed.*, Oxford University Press, London 2015
4. Huang, Z., Letteri, JJ., Ronco, C., Clark, WR., Basic Principles of Solute Transport. In: Kellum, J., Bellomo, R., Ronco, C., (Eds). *Handbook of CRRT, 2nd ed.*, Oxford University Press, London 2015
5. Huang, Z., Clark, WR., Ronco, C., Solute Clearance. In: *Encyclopedia of Intensive Care Medicine*, 1st ed; eds Springer Verlag, Heidelberg; 2012
6. Huang, Z., Clark, WR., Ronco, C., Diffusive Clearance. In: Hall, J., Vincent, JL., (Eds.) *Encyclopedia of Intensive Care Medicine*, 1st ed., Springer Verlag, Heidelberg, 2012
7. Huang, Z., Clark, WR., Ronco, C., Convective Clearance. In: Hall, J., Vincent, JL., (Eds.), *Encyclopedia of Intensive Care Medicine*, 1st ed., Springer Verlag, Heidelberg, 2012.
8. Huang, Z., Clark, WR., Ronco, C., Dialysis Membranes. In: Hall, J., Vincent, JL., (Eds.). *Encyclopedia of Intensive Care Medicine*, 1st ed., Springer Verlag, Heidelberg, 2012
9. Huang, Z., Gao, D., Ronco, C., Clark, WR., The biology of dialysis. In: Warady, BA, Schaefer, FN, Alexander, SR., (Eds.), *Pediatric Dialysis*, 2nd ed., Springer Publishers, New York, 2012
10. Van Geertruyden, W.H, Huang, Z., Clark, W.R., Hemodialysis Membranes History, Properties, and Future Development, In: Kaustubha Mohanty and Mihir K. Purkait (Eds), *Membrane Technologies and Applications*, Taylor and Francis, LLC, December, 2011
11. Huang, Z., Ronco, C., Clark, W.R., Solute Clearance, In: Vincent, J-L & Hall, J.B. (Eds.), *Encyclopedia of Intensive Care Medicine*, Springer-Verlag Berlin Heidelberg, 2010
12. Gao, D., Huang, Z., (Eds), *Artificial Kidney --- Fundamentals, Research Approaches and Advances*, University of Science and Technology of China Press, ISBN 978-7-312-0220-3,

Hefei, China, 2009 (in English)

13. Huang, Z., Letteri, J.J., Ronco, C., Clark, W.R., In: The Membrane: Size and Material. In: Kellum, J., Bellomo, R., Ronco, C. (Eds), *Handbook of CRRT*, 1st ed, Oxford University Press, London, 2009
14. Huang, Z., Letteri, J.J., Ronco, C., Clark, W.R., Basic Principles of Solute Transport. In: Kellum, J., Bellomo, R., Ronco, C.(Eds), *Handbook of CRRT*, 1st ed, Oxford University Press, London, 2009.
15. Letteri, J.J., Ronco, C., Huang, Z., Gao, D., Clark, W.R., Convective Renal Replacement Therapies for Acute Renal Failure and End-Stage Renal Disease, In: Nissenson, A.R., Fine, R.N.(Eds), *Handbook of Dialysis Therapy*, 4th ed, Saunders Elsevier: Philadelphia, 2008, 521-536
16. Huang, Z., Letteri, J.J., Ronco, C., Gao, D., Clark, W.R., Solute and Water Transport Across Artificial Membranes in Conventional Hemodialysis. In: Ronco, C., Kellum, J.A., Bellomo, R. (Eds), *Critical Care Nephrology* 3rd ed, Elsevier; 2008
17. Huang, Z., Letteri, J.J., Ronco, C., Gao, D., Clark, W.R., Pre- and Post-Dilution Reinfusion Techniques. In: Ronco, C., Kellum, J.A., Bellomo, R. (Eds), *Critical Care Nephrology* 3rd ed, Elsevier, 2008
18. Letteri, J.J., Huang, Z., Ronco, C., Gao, D., Clark, W.R., Solute and Water Kinetics in Continuous Treatments. In: Ronco, C., Kellum, J.A., Bellomo, R. (Eds), *Critical Care Nephrology* 3rd ed, Elsevier, 2008
19. Huang, Z., Henderson, L., Gao, D., Clark, W., Hemofiltration and Hemodiafiltration for End Stage Renal Disease. In: Perira, B., (Ed), *Chronic Kidney Disease, Dialysis & Transplantation*, e Elsevier Saunders, 2004

(C) Conference Abstract:

1. Z. Huang, Z., Letteri, J. J., Attaluri, A., Study of Dilution Modes and Transmembrane Pressure under Different Operational Conditions in CVVH, *AKI & CRRT 2020* – San Diego, 2020.
2. Z. Huang, Z., Letteri, J. J., Attaluri, A., Study of Dilution Modes Under Different Operational Conditions in CVVH, *ASN (American Society of Nephrology) Kidney Week 2019*, Washington DC, November 2019.
3. Gu, Q., Zhang, Y., Huang, Z., An Innovative Methodology for Developing a Wearable Artificial Kidney, *ASAIO's 61st Annual Conference*, Chicago, IL, June 2015
4. Huang, Z., Attaluri, A. C., Gao, D., Beck, W., Buck, R., Shideman, J., Comparison of clearance and fluid distributions of newly designed high flux hemodialyzers, *ASAIO Journal 2010*: 56(2), p. 139, 2010.
5. Huang, Z., Gao, D., Peter F., Bernardo A. A., Optimization of flow distribution with new hollow fiber dialyzer, *2nd Congress of International Society for Hemodialysis 2009*, Hong Kong, China, August, 2009
6. Huang, Z., Attaluri, A.C., Khan, M., Letteri, J.J., Clark, W.R., Therapy Factors Influencing Dose Delivery in Continuous Venovenous Hemofiltration (CVVH), *ASN (American Society of Nephrology) 41th Annual Meeting & Science Exposition*, Philadelphia, PA, November, 2008

7. Huang, Z., Attaluri, A.C., Schneider, M., Van Geertruyden, W., Bastin, L.D., Morris, R., Misiolek, W., A novel nanoporous alumina membrane for hemodialysis, *ASN (American Society of Nephrology) 41th Annual Meeting & Science Exposition*, Philadelphia, PA, November, 2008
8. Attaluri, A.C., Khan, M., Huang, Z., Dual Cartridge Hemodialysis Systems, *ASAIO's 54th Annual Conference*, San Francisco, CA, June, 2008
9. Huang, Z., Letteri, J.J., Attaluri, A.C., Gao, D., Clark, W.R., Effect of Dilution Mode and Flow Conditions on Middle Molecule (MM) Clearance in Continuous Venovenous Hemofiltration (CVVH), *The 14th international conference on CRRT*, San Diego, CA, February, 2008
10. Letteri, J.J., Huang, Z., Gao, D., Clark, W.R. Relationship Between Operating Conditions and Filter Performance in High-Dose CVVH, *Blood Purif* 2007;25:355, 2007
11. Letteri, J.J., Huang, Z., Gao, D., Clark, W.R. Effect of Dilution Mode and Blood Flow Rate on Small Solute Clearance in CVVH, *Blood Purif* 2007;25:345, 2007
12. Belwalkar, A., Huang, Z., Geertruyden, W., Experimental Study of Nanoporous Ceramic Tube for Potential Application in Hemodialysis, *ASAIO Journal*. 52(2):75A, March/April, 2006
13. Huang, Z., Zhang, W., Ahuja, A., Rodby, R., Gao, D., Clark, W. Blood Flow Rate Effects in High-Dose Pre-Dilution CVVH. *Blood Purif* 2003; 21: 363, 2003
14. Huang, Z., Liao, Z., Cui, X., Moey, K., Gao, D., Clark, W., Effect of Ultrafiltration Rate on Hemofilter Performance in Pre-Dilution CVVH, *ASN (American Society of Nephrology) 35th Annual Meeting & Science Exposition*, Philadelphia, PA, 2002
15. Huang, Z., Liao, Z., Cui, X., Moey, K., Morti, S., Gao, D., Clark, W., Determinants of Solute Clearance in Hemodiafiltration (HDF), *ASN (American Society of Nephrology) 35th Annual Meeting & Science Exposition*, Philadelphia, PA, 2002
16. Liao, Z., Poh, C., Huang, Z., Hardy, P., Morti, S., Gao, D., Clark, W., A modified Equivalent Annulus Model for Artificial Kidney, *ASAIO J*, 48 (2) 2002: 178, 2002
17. Liao, Z., Poh, C., Huang, Z., Hardy, P., Morti, S., Clark, W., Gao, D., Measurement of Hollow Fiber Membrane Transport Properties in Hemodialyzers, *ASAIO J*, 48 (2) 2002: 178, 2002

PROFESSIONAL AFFILIATIONS:

1. American Society of Mechanical Engineering (ASME)
2. Biomedical Engineering Society (BMES)
3. International Society of Lyophilization and Freeze Drying (ISLFD)