

July 2022

A. TERRENCE CONLISK JR.

EDUCATION

Purdue University: Ph.D. in Mechanical Engineering, 1978

Purdue University: M.S. in Mathematics, 1974

Xavier University: B.S. in Mathematics, 1972

EXPERIENCE

September 1980 - Present: The Ohio State University, Columbus, Ohio, Department of Mechanical Engineering, Assistant Professor; Professor, 1996; Professor Emeritus, July 1, 2015-present

August 1978 - August 1980: Lehigh University, Bethlehem, Pennsylvania, Department of Mechanical Engineering and Mechanics, Adjunct Assistant Professor

PROFESSIONAL SERVICE

Special Assignments

Co-organizer with Guowei Wei and Charles Bell, “Modeling and Simulation of Biomolecular Structure and Dynamics”, OSU Mathematical Biosciences Institute Current Topic Workshop, April 25-29, 2011.

Organizer: “The Computational Fluid Dynamics of Micro- and Nanoscale Devices”, workshop held in conjunction with the Ohio Innovation Summit, Dayton, OH, April 20-23, 2009.

Organizer: “Nanoscale Experimental Methods and Modeling”, a one-day workshop held in conjunction with the Ohio Nanotechnology Summit, Mason, OH, April 9, 2008, with Minami Yoda.

Panelist: National Science Foundation Microfluidics Unsolicited Proposal Panel, February, 2008 and June 2008.

Organizer: ARO/ARL Workshop on New Topics in Biomolecular Transport, October 3,4, 2005, Aberdeen, MD. Sponsored by the Army Research Office in

conjunction with Army Research Laboratory.

Assistant Organizer: American Institute of Aeronautics and Astronautics(AIAA) 3rd Theoretical Fluid Mechanics Meeting, June 2005.

Organizer, ASME Short Course on Microfluidics, Instructor Microfluidics Modeling Unit, April 18-20, 2005.

Organizer, ASME Short Course on Microfluidics, Instructor Microfluidics Modeling Unit, April 26-28, 2004.

Panelist: National Science Foundation Microfluidics Unsolicited Proposal Panel, December 6, 7 2004.

Panelist: National Science Foundation Information Technology Program, May 2003.

Technical Chair: 27th AIAA Fluid Dynamics Meeting, 1996, New Orleans.

Overall responsibility for the review and scheduling of 160 papers in all areas of fluid dynamics. Responsibility for choosing invited speakers and overall planning. The meeting drew approximately 300 participants.

Panelist: National Science Foundation Fluid and Thermal Systems SBIR Program, Autumn 1991.

Contributor: Summary of Recent Developments in Fluid Dynamics, *Aerospace America*, December 1990, pp. 46-47.

General Chair: Workshop on Analytical Methods in Unsteady Separation, January 25-26, 1990, Columbus, Ohio. Sponsored by Army Research Office.

Responsibility for organizing the workshop including choice of meeting site and invitations to participants. the Workshop drew about 35 participants from all over the United States and Europe.

Professional Societies, Reviewing, and Special Committees

Member: AIAA Committee on Standards 1997-2021

Member: AIAA Fluid Dynamics Technical Committee, 1994-1997, 2000-2002, 2003-2006. **Liason** to the AIAA Committee on Codes and Standards 2000-2002 and 2003-2006.

Chair, AIAA Microfluidics Discussion Group, 2003-2005.

Associate Fellow AIAA

Corresponding Member: ASHRAE Technical Committee 8.3 Absorption and Heat Operated Machines 1993-2000. Secretary 1997-1999.

Member: American Physical Society, Division of Fluid Dynamics 1982 to present.

Member: ASME Technical Committee on Flow Induced Noise and Vibration, Technical Committee on Numerical Methods in Acoustics, **Liason** to Acoustical Society of America 1984-1990.

Member: Organizing Committee for the APS Division of Fluid Dynamics Meeting, held at The Ohio State University, November, 1986.

Organizer of sessions, and **Session Chair** at numerous technical meetings including AIAA Aerospace Sciences Meeting, AIAA Fluid Dynamics Meeting, American Physical Society, Division of Fluid Dynamics, ASME Winter Annual Meeting, and others.

Referee: Journal of Fluid Mechanics, Physics of Fluids, Quarterly Journal of Mechanics and Applied Mathematics, Analytical Chemistry, Nanoletters, Biomedical Microdevices, Electrophoresis, Journal of Colloid and Interface Science, ASME Journal of Fluids Engineering, Journal of Fluids and Structures, International Journal of Heat and Mass Transfer, AIAA Journal, AIChE Journal, Canadian Journal of Chemical Engineering, ASHRAE Transactions, International Journal of HVAC&R Research, AIAA Aerospace Sciences Meeting, ASME Winter Annual Meeting, AIAA Fluid Dynamics Meeting.

Reviewer: National Science Foundation Fluid Dynamics Program, US Army Research Office, Office of Naval Research, Israel Science Foundation, Science Foundation of Ireland.

Panel Member: National Science Foundation CAREER Program, November 1999.

AWARDS AND RECOGNITION

A. T. Conlisk, Giorgio Rizzoni, Simona Onori, Yann Guezennec, Marcello Canova, Suresh Babu, Mike Mills, Lei Cao, Bharat Bhushan, Wolfgang Windl, and Steve

Yurkovich, The Ohio State University College of Engineering 2012 Lumley Interdisciplinary Research Award.

Elected Associate Fellow *American Institute of Aeronautics and Astronautics*, 1995.

Entry in *Who's Who in Science and Engineering*, 3rd Edition 1996-1997, *Best in North America*, and *Who's Who in Engineering Education*.

Lumley Research Award, The Ohio State University College of Engineering, 1997.

As a result of an **OSU press release** upon publication of a paper in the journal *Analytical Chemistry*, news clips on Professor Conlisk's have appeared at w4engineering.com, smalltimes.com, nanotechweb.org and wired.com. Professor Conlisk has been featured in the on-line daily news headlines at OSU and in the OSU Faculty and Staff publication *On Campus*, in the College of Engineering publication *News in Engineering* and in the Columbus Dispatch.

Leading Scientists of the World, 2005, International Biographical Centre, Cambridge, England.

A. T. Conlisk, Giorgio Rizzoni, Simona Onori, Yann Guezennec, Marcello Canova, Suresh Babu, Mike Mills, Lei Cao, Bharat Bhushan, Wolfgang Windl, and Steve Yurkovich, Lumley Interdisciplinary Research Award, 2012.

2020 Marquis **Albert Nelson Lifetime Achievement Award**, Marquis Who's Who

BOOKS

A. T. Conlisk, "The Essentials of Micro- and Nanofluidics with Application to the Biological and Chemical Sciences", Cambridge University Press, 2013, 537 pages.

A. T. Conlisk, "Advanced Mathematical Methods with Application to Engineering and the Physical Sciences", in process with estimated publication date 2023.

ARCHIVAL PUBLICATIONS

A. T. Conlisk and J. D. A. Walker, "Incompressible Source-Sink Flow in a

Rapidly Rotating Annulus”, *Quarterly Journal of Mechanics and Applied Mathematics*, **34**, pp. 89-109, 1981.

A. T. Conlisk and D. O. Rockwell, “Modelling of Vortex-Corner Interactions Using Point Vortices”, *Physics of Fluids*, **24**, pp. 2133-2142, 1981.

A. T. Conlisk and J. D. A. Walker, “Forced Convection in a Rapidly Rotating Annulus”, *Journal of Fluid Mechanics*, **122**, pp. 91-108, 1982.

A. T. Conlisk, M. R. Foster, and J. D. A. Walker, “Fluid Dynamics and Mass Transfer in a Gas Centrifuge”, *Journal of Fluid Mechanics*, **125**, pp. 283-318, 1982.

A. T. Conlisk, “Effect of Source-Sink Geometry on Enrichment in a Gas Centrifuge”, *Physics of Fluids*, **26**, pp. 2946-2957, 1983.

A. T. Conlisk, “Computation of Far-Field Sound Generation in a Fluid-Structure Interaction Problem”, *Journal of Vibration, Acoustics, Stress and Reliability in Design*, **107**, No. 2, pp. 210-215, 1985.

A. T. Conlisk and Duane Veley, “The Generation of Noise in Impinging Vortex Motion past a Step”, *Physics of Fluids*, **28**, pp. 3004-3012, 1985.

A. T. Conlisk, “The Effect of Aspect Ratio and Feed Flowrate on the Separative Power of a Gas Centrifuge”, *Chemical Engineering Science*, **41**, No. 10, pp. 2639-2650, 1986.

R. E. Johnson and **A. T. Conlisk**, “Laminar Film Condensation and Evaporation on a Vertically Fluted Surface”, *Journal of Fluid Mechanics*, **184**, pp. 245-266, 1987.

Fu-Sheng Chuang and **A. T. Conlisk**, “The Effect of Interaction on the Boundary Layer Induced by a Convected Rectilinear Vortex”, *Journal of Fluid Mechanics*, **200**, pp. 337-365, 1989.

A. T. Conlisk, Y. G. Guezennec, and G. S. Elliott, “Chaotic Motion of an Array of Vortices Above a Flat Wall”, *Physics of Fluids A*, **1**, pp. 704-717, 1989.

Zhang Cunzhen and **A. T. Conlisk**, “Mass Transfer in a Gas Centrifuge at High Flowrate”, *Journal of Fluid Mechanics* **208**, pp. 355-373, 1989.

C. M. Kim and **A. T. Conlisk**, “Flow Induced Vibration and Noise by a Pair of Tandem Cylinders due to Buffeting”, *Journal of Fluids and Structures*, **4**, pp.

471-493, 1990.

Bryan Tucker and **A. T. Conlisk**, “Massive Vortex Motion in the Presence of Solid Boundaries”, *Physics of Fluids A*, **4**, no. 2, pp. 290-305, 1992.

A. T. Conlisk, “Falling Film Absorption on a Cylindrical Tube”, *AIChE J.*, **38**, no. 11, pp. 1716-1728, 1992.

C.M. Kim and **A. T. Conlisk**, “The Flow and Acoustic Field due to an Inclined Plate Fitted with a Downstream Splitter”, *J. Sound Vib.*, **166**, no. 2 pp. 209-236, 1993.

H. Affes and **A. T. Conlisk**, “A Model for Rotor Tip Vortex-Airframe Interaction, Part 1: Theory”, *AIAA J.*, **31**, no. 12, pp. 2263-2273, 1993.

H. Affes, **A. T. Conlisk**, J.M. Kim, and N.M. Komerath, “A Model for Rotor Tip Vortex-Airframe Interaction, Part 2: Comparison with Experiment”, *AIAA J.*, **31**, no. 12, pp. 2274-2282, 1993.

A. T. Conlisk, “The Structure of Falling Film Heat and Mass Transfer on a Fluted Tube”, *AIChE J.*, **40**, no. 5, pp. 756-766, 1994.

A. T. Conlisk, “Semi-Analytical Design of a Falling Film Absorber”, *ASME J. Heat Transfer*, **116**, no. 4, pp. 1055-1058, November 1994.

Z. Xiao, H. Affes, and **A. T. Conlisk**, “The Boundary Layer Flow due to a Vortex Approaching a Cylinder”, *J. Fluid Mech*, **275**, pp. 33-58, 1994.

A. T. Conlisk, “Analytical Solutions for the Heat and Mass Transfer in a Falling Film Absorber”, *Chem. Eng. Sci.*, **50**, no. 4, pp. 651-660, 1995.

A. T. Conlisk, “The Effect of Coolant Flow Conditions on the Performance of an Absorber”, *ASHRAE Transactions*, **101**, Part 2, pp. 73-80, 1995.

Eric Adams, **A. T. Conlisk**, and F. T. Smith, “Adaptive Grid Methods for Vortex-Induced Boundary Layers”, *AIAA J*, **33**, no. 5, May, pp. 864-870, 1995.

A. T. Conlisk, “A Model for the Prediction of the Performance of a Spined-Tube Absorber: Part 1 Governing Equations and Dimensional Analysis”, *ASHRAE Transactions*, **102**, Part 1, pp. 110-121, 1996.

A. T. Conlisk, “A Model for the Prediction of the Performance of a Spined-Tube Absorber: Part 2 Model and Results”, *ASHRAE Transactions*, **102**, Part 1, pp.

122-131, 1996.

A. T. Conlisk, “Analytical Solutions for Falling Film Absorption of Ternary Mixtures, Part 1: Theory”, *Chemical Engineering Science*, **51**, no. 7, pp. 1157-1168, 1996.

A. T. Conlisk and Jie Mao, “Non-Isothermal Absorption on a Horizontal Tube Part 1: Film Flow”, *Chemical Engineering Science*, **51**, no. 8, pp. 1275-1285, 1996.

Z. Xiao, E. C. Adams, and **A. T. Conlisk**, “Terminal Structure of Unsteady Classical and Interacting Boundary Layers”, *Physics of Fluids*, **8**, no. 6, pp. 1397-1407, 1996.

Z. Xiao and O. R. Burggraf, and **A. T. Conlisk**, “The Interacting Boundary Layer Due to a Vortex Outside a Cylinder”, *Journal of Fluid Mechanics*, **346**, Sept. 10, pp. 319-346, 1997.

Z. Xiao, H. Affes, **A. T. Conlisk**, J.M. Kim, and N. M. Komerath, “A Model for Rotor Tip Vortex-Airframe Interaction Part 3: The Viscous Flow on the Airframe”, *AIAA Journal*, **36**, no. 2, pp. 409-415, February 1998.

J. A. Lee, O. R. Burggraf, and **A. T. Conlisk**, “On the Impulsive Blocking of a Vortex-Jet”, *Journal of Fluid Mechanics*, **369**, Sept. 25, pp. 301-331, 1998.

Rohit Jain, and **A. T. Conlisk**, “Interaction of Tip-Vortices in the Wake of a Two-Bladed Rotor in Axial Flight”, *Journal of the American Helicopter Society*, **45**, no. 3, July 2000, pp. 157-164.

T. D. Radcliff, O. R. Burggraf and **A. T. Conlisk**, “On the Three- Dimensional Interaction of a Rotor Tip-Vortex with a Cylindrical Surface”, *Journal of Fluid Mechanics*, **425**, pp. 301-334, 2000.

Jeff Lee and **A. T. Conlisk**, “Collision of a Vortex Jet with Stator Vanes”, *AIAA J.*, **38**, no. 3, March 2000.

Santosh Kini and **A. T. Conlisk**, “On the Nature of Locally Steady Rotor Wakes”, *Journal of Aircraft*, **39**, no. 5, pp. 750-758, 2002.

Hui Li, O. R. Burggraf, and **A. T. Conlisk**, “On the Formation of a Rotor Tip Vortex”, *Journal of Aircraft*, **39**, no. 5, pp. 739-749, 2002.

A. T. Conlisk, Jennifer McFerran, Zhi Zheng and Derek Hansford, “Mass Trans-

fer and Flow in Electrically Charged Micro- and Nano-channels”, *Analytical Chemistry*, **74**, Issue 9, pp. 2139-2150, 2002.

Zhi Zheng, Derek J, Hansford, and **A. T. Conlisk**, “Effect of Multivalent Ions on Electroosmotic Flow in Micro and Nanochannels”, *Electrophoresis*, **24**, pp. 3006-3017, August 2003.

Reza Sadr, Minami Yoda, Z. Zheng and **A. T. Conlisk**, “An Experimental Study of Electroosmotic Flow in Rectangular Microchannels”, *Journal of Fluid Mechanics*, **506**, pp. 357-367, 2004.

Wei Zhu, Sherwin Singer, Zhi Zheng and **A. T. Conlisk**, “ Electroosmotic Flow of a Model Electrolyte”, *Phys. Rev. E*, **71**, pp. 041501-1 to 041501-12, 2005.

A. T. Conlisk, “The Debye-Huckel Approximation: Its Use in Describing Electroosmotic Flow in Micro and Nano-channels”, *Electrophoresis*, **26**, pp. 1896-1912, 2005.

S. Bhattacharyya, Z. Zheng and **A. T. Conlisk**, “Electroosmotic Flow in Two-dimensional Charged Micro- and Nanochannels, *Journal of Fluid Mechanics*, **540**, pp. 247-267, 2005.

Pulak Nath, Shuvo Roy, **A. T. Conlisk** and Aaron Fleischman, “A System for Micro/Nano Fluidic Flow Diagnostics”, *Biomedical Microdevices*, **7**, no. 3, pp. 169-177, 2005.

Reza Sadr, Minami Yoda, P. Gnanaprakasam and **A. T. Conlisk**, “Experimental Measurements Inside the Diffuse Electric Double Layer in Electroosmotic Flow”, *Applied Physics Letters*, **89**, 044103-044106, 2006. Also selected for the August 7, 2006 issue of Virtual Journal of Nanoscale Science and Technology. The Virtual Journal, which is published by the American Institute of Physics and the American Physical Society in cooperation with numerous other societies and publishers, is an edited compilation of links to articles from participating publishers, covering a focused area of frontier research.

V. Godavarty, D. P. Pulla, O. R. Burggraf and **A. T. Conlisk**, “An Inviscid Model of the Formation of a Rotor Tip Vortex”, *AIAA J.*, **44**, no. 7, pp. pp. 1653-1661, 2006.

J. C. Ramirez and **A. T. Conlisk**, “Formation of Vortices Near Abrupt Nano-channel Height Changes in Electroosmotic Flow of Aqueous Solutions”, *Biomedical Microdevices*, **8**, no. 4, pp. 325-330, 2006.

A. T. Conlisk, Ankan Kumar and Arfaan Rampersaud, “Ionic and Biomolecular Transport in Nanochannels”, *Nanoscale and Microscale Thermophysical Engineering*, **11**, nos. 1 and 2, pp. 177-199, 2007.

Lei Chen and **A. T. Conlisk**, “Electroosmotic Flow and Particle Transport in Micro/nano Nozzles and Diffusers”, *Biomedical Microdevices*, **10**, no. 2, April 2008.

Subhra Datta, **A. T. Conlisk**, H. F. Li and Minami Yoda, “Effect of Divalent Ions on Electroosmotic Flow,” *Mechanics Research Communications*, **36**, pp. 65-74, 2009.

Lei Chen and **A. T. Conlisk**, “Effect of Nonuniform Surface Potential on Electroosmotic Flow at Large Applied Electric Field Strength”, *Biomedical Microdevices*, **11**, no. 1, February 2009.

A.T. Conlisk, S. Datta, W. H. Fissell and S. Roy, “Biomolecular Transport Through Hemofiltration Membranes”, *Annals of Biomedical Engineering*, **37**, no. 4, pp. 722-736, 2009.

Lei Chen and **A. T. Conlisk**, “DNA Nanowire Translocation Phenomena in Nanopores”, *Biomedical Microdevices*, **12**, no. 12, pp. 235-245, 2010.

Subhra Datta, **A.T. Conlisk**, Dharmesh M. Kanani, Andrew L. Zydney, William H. Fissell, and Shuvo Roy, “Characterizing the Surface Charge of Synthetic Nanomembranes by the Streaming Potential Method”, *Journal of Colloid and Interface Science*, **348**, issue 1, pp. 85-95, 2010.

W. H. Fissell, **A. T. Conlisk**, Subhra Datta, Jeffrey M. Majestrelli, Jeffrey T. Glass, Aaron J. Fleischman and Shuvo Roy, “High Knudsen Number Flow at Near Standard Temperature and Pressure Conditions Using Precision Nanochannels”, *Microfluidics and Nanofluidics*, **10**, no. 2, 425-434, 2011.

Lei Chen and **A. T. Conlisk**, “Forces Affecting Double-stranded DNA Translocation Through Synthetic Nanopores”, *Biomedical Microdevices*, **13**, no. 2, pp. 403-415, 2011.

Harvey A. Zambrano, Marie Pinti, **A. T. Conlisk** and Shaurya Prakash, “Electrokinetic Transport in a Waterchloride Nanofilm in Contact with a Silica Surface with Discontinuous Charged Patches”, *Microfluidics and Nanofluidics*, **13**, no. 5, pp. 735-747, 2012.

- J. Marcicki, M. Canova, **A.T. Conlisk**, and G. Rizzoni, Design and Parametrization Analysis of a Reduced-Order Electrochemical Model of Graphite/LiFePO₄ Cells for SOC/SOH Estimation, *Journal of Power Sources*, **237**, pp. 310-324, 2013.
- J. Marcicki, **A.T. Conlisk**, and G. Rizzoni, “A Lithium-ion Battery Model Including Electrical Double Layer Effects”, *Journal of Power Sources*, **251C**, pp. 157-169, 2014.
- A.T. Conlisk**, “Micro and Nanofluidics: Historical Perspectives and Challenges”, *J. Nanotechnol. Eng. Med.*, **4**, no. 2, pg. 020908, 2014.
- K. W. Cassel and **A. T. Conlisk**, “Unsteady Separation in Vortex-induced Boundary Layers”, *Proc. Roy. Soc. A*, **372**, no. 2020, id. 20130348, pp. 1-19, 2014.
- M. Fuest, C. Boone, Kaushik Rangharajan, **A. T. Conlisk** and S. Prakash, “A Three-State Nanofluidic Field Effect Switch”, *Nanoletters*, **15**, no. 4, pp. 2365-2371, 2015.
- Kaushik Rangharajan, Kwang J. Kwak, **A.T. Conlisk**, Yan Wuc, and Shaurya Prakash, “Effect of Surface Modification on Interfacial Nanobubble Morphology and Contact Line Tension”, *Soft Matter*, **11**, pp. 5214-5223, 2015.
- Shaurya Prakash, Harvey A. Zambrano, Marie Fuest, Caitlin Boone, Emily Rosenthal-Kim, Nicolas Vasquez, and **A. T. Conlisk**, “Electrokinetic Transport in Silica Nanochannels with Asymmetric Surface Charge”, *Microfluidics and Nanofluidics*, **19**, issue 6, pp. 1455-1464, 2015.
- Kaushik Rangharajan, Harvey Zambrano, Shaurya Prakash, and **A.T. Conlisk**, “Electrokinetic Transport of Monovalent and Divalent Cations in Silica Nanochannels”, *Microfluidics and Nanofluidics*, **20**, no. 1, pp. 1-8, 2016.
- Kaushik Rangharajan, M. Fuest, **A. T. Conlisk** , and Shaurya Prakash, “Electrokinetic Transport of Multicomponent, Multivalent Electrolyte Solutions Across Nanocapillaries”, *Microfluidics and Nanofluidics*, **20**, no. 4, pp. 1-13, 2016.
- Shaurya Prakash, and **A.T. Conlisk**, “Field Effect Nanofluidics”, *Lab on a Chip*, **16**, pp. 3855 - 3865, 2016.
- Marie Fuest, Kaushik Rangharajan, Caitlin Boone, **A.T. Conlisk**, and Shaurya Prakash, “Cation Dependent Surface Charge Regulation in Gated Nanofluidic

Devices”, *Analytical Chemistry*, **89**, pp. 15931601, 2017.

Kaushik Rangharajan, P. Mohanasundaram, **A. T. Conlisk**, and Shaurya Prakash, “Surface Dependent Enhancement in Water Vapor Transport through Nanochannels”, *Analyst*, **143**, no. 18, pp. 4256-4266. 2018.

V. Lochab, A. Yee, Minami Yoda, **A. T. Conlisk**, and Shaurya Prakash, “Dynamics of Colloidal Particles in Microchannels under Combined Pressure and Electrical Potential Gradients”, *Microfluidics and Nanofluidics*, **23**, no. 134, <https://doi.org/10.1007/s10404-019-2304-0>, 2019.

V. Lochab, A. Yee, M. Yoda, **A. T. Conlisk**, S. Prakash, “Ultrastructure Imaging of Pseudomonas Aeruginosa Lawn Biofilms and Eradication of the Tobramycin-resistant Variants under *in vitro* Electroceutical Treatment”, *Scientific Reports*, **10**, 9879, 2020.

REVIEW ARTICLES AND BOOK CHAPTERS

A. T. Conlisk, “Fluid Dynamics and Design of Gas Centrifuges” in *Encyclopedia of Fluid Mechanics*, Vol. 2, Chapter 46, ed. Nicholas Cheremisinoff, Gulf Publishing, West Orange, New Jersey, pp. 1393-1432, 1985 (Invited).

A. T. Conlisk, A. J. Smits and M. R. Visbal, “Summary of Recent Developments in Fluid Dynamics”, *Aerospace America*, December 1994, pp. 12-13. This is a review article citing the major developments in fluid dynamics in the previous year.

A. T. Conlisk, “Modern Helicopter Aerodynamics”, in *Annual Review of Fluid Mechanics*, **27**, pp. 515-567, 1997.

A. T. Conlisk, “Helicopter Aerodynamics”, in *McGraw-Hill Yearbook of Science and Technology*, 1999.

A. T. Conlisk, “Modern Helicopter Rotor Aerodynamics”, *Progress in Aerospace Sciences*, **37**, pp. 419-476, 2001 (Invited).

A. T. Conlisk, C. Roy, A. Seifert, and S. Gogineni, “Summary of Recent Developments in Fluid Dynamics”, *Aerospace America*, December 2004. This is a review article citing the major developments in fluid dynamics in the previous year.

A. T. Conlisk and Sherwin Singer, “Modeling Electroosmotic flow in Nanochan-

nels”, *Biomolecular Sensing, Processing and Analysis* (eds. R. Bashir and S. Wereley), Volume IV, *Handbook of BioMEMS and Biomedical Nanotechnology*, Springer, May 2006 pp. 301-330.

A. T. Conlisk, “Modelling Biomolecular Transport in Nanochannels”, in *Handbook of BioMEMS and Biomedical Nanotechnology*, (eds. Abraham P. Lee and L. James Lee), *Volume I, Biomedical and Biological Nanotechnology*, Springer, May 2006, pgs. 399-433.

A. T. Conlisk, “Computational Micro/Nanofluidics: the Unifier of the Physical and Natural Sciences and Engineering”, *Encyclopedia of Nanotechnology*, ed. Bharat Bhushan, pp. 463-470, 2012.

SPECIAL PUBLICATIONS

William L. Oberkampf, Munir Sindir, and **A. T. Conlisk**, “Guide for the Verification and Validation of Computational Fluid Dynamics Simulations”, AIAA G-077-98. This is a document which lays out procedures for assessing the reliability of fluid dynamics computations and was commissioned by the American Institute of Aeronautics and Astronautics(AIAA). This is a guide which has official AIAA endorsement.

American Institute of Aeronautics and Astronautics(AIAA) Committee on Standards, “Code Verification in Computational Fluid Dynamics”, Recommended Practice, AIAA R-141-2021, 2021. Member: Committee on Standards.

INVITED PROCEEDINGS AND PRESENTATIONS

All of these Proceedings included a presentation. All presentations by **A. T. Conlisk** unless otherwise noted.

A. T. Conlisk, M.R. Foster and J.D.A. Walker, “Asymptotic Theory of Mass Transfer in a Gas Centrifuge for Small Ekman Number”, Proceedings of the Fifth Workshop on Gases in Strong Rotation, June 5-9, 1983, University of Virginia, Charlottesville, Virginia.

A. T. Conlisk, “An Asymptotic Approach to Vortex-Boundary Collisions”, International Workshop on Advances in Analytical Methods in Aerodynamics, July 12-14, 1993 Miedzyzdroje, Poland, titled *Advances in Analytical Methods in Modeling of Aerodynamic Flows*, ed. J. D. A. Walker, M. Barnett, and F. T. Smith, pp. 160-163.

A. T. Conlisk, “A Theory of Vortex-Surface Collisions”, paper 98-2858, 2nd AIAA Theoretical Fluid Dynamics Meeting, Albuquerque, NM, June 1998.

A. T. Conlisk, “Report on the Workshop on Analytical Methods in Unsteady Separation”, presented at the Workshop on the Physics of Forced Unsteady Separation, April 17-19, 1990, NASA Ames Research Center, Moffett Field, California.

A. T. Conlisk, “The Fluid Dynamics of Rotor Wakes: Theory, Computation and Experiment”, AIAA paper 99-3421, 29th Fluid Dynamics Conference, Norfolk, VA, June 1999.

A. T. Conlisk, “Micro and Nanofluidics: Liquid Flows in Teeny Channels”, Modeling vs. Design Workshop, AIAA Aerospace Sciences Meeting, Reno, Jan. 6, 2004.

A. T. Conlisk, “Modeling Transport in Micro and Nanofluidic Devices”, NSF Workshop on Control and System Integration of Micro and Nano-scale Systems”, March 29,30 2004. One of 75 out of 400 applications to attend. One of four review presentations.

A. T. Conlisk, “Nanopore Membranes: Mathematical Models for Ionic and Biomolecular Transport”, Workshop on the Continuum Modeling of Biomolecules, Institute of Computational Mathematics and Scientific/Engineering Computing, Chinese Academy of Sciences, September 14-16, 2009.

REFEREED PROCEEDINGS

All of these Proceedings included a presentation. All presentations by **A. T. Conlisk** unless otherwise noted.

A. T. Conlisk, R. N. Christensen and J. Roy, “Comparison of Theoretical and Experimental Models of Heat Transport from a Nuclear Waste Repository”, Proceedings of the Canadian Nuclear Society International Conference on Radioactive Waste Management, Winnipeg, Manitoba, September 12-15, 1982, pp. 641-648.

N. Ramanan and **A. T. Conlisk**, “Calculation of Noise Generation in Vortex Impingement on a Semi-Infinite Block of Finite Thickness”, Proceedings of the National Noise Control Conference, The Ohio State University, June 3-5, 1985, pp. 63-68.

A. T. Conlisk, “Noise Generation in Flow Past a Semi-Infinite Block”, paper

86-WA/NCA-17, December 7-12, 1986.

A. T. Conlisk, O. R. Burggraf and F. T. Smith, "Nonlinear Neutral Modes in the Blasius Boundary Layer", ASME Applied Mechanics, Bioengineering and Fluids Engineering Conference, June 14-17, 1987, Cincinnati, Ohio, *Forum on Unsteady Flow Separation*, pp. 119-121.

C. M. Kim and **A. T. Conlisk**, "Flow Induced Vibration and Noise by a Pair of Tandem Cylinders", ASME International Symposium on Flow Induced Vibration and Noise, vol. 2, Winter Annual Meeting, Chicago, December 1988, pp. 1-21.

A. T. Conlisk, Y. G. Guezennec, and G. Elliott "The Motion and Acoustic Field Generated by a Vortex Above a Plane Wall", ASME International Symposium on Flow Induced Vibration and Noise, Winter Annual Meeting, Chicago, December 1988.

A. T. Conlisk, "The Pressure Field in Intense Vortex Boundary Layer Interaction", AIAA-89-0293, January 9-12, Reno, Nevada, 1989.

H. Affes, M. R. Foster, and **A. T. Conlisk**, "The Flow in a Short-Dwell Coater", TAPPI Coating Conference Proceedings, Boston, May, 1990, pp. 299-307.

A. T. Conlisk and M.R. Foster, "The Steady Flow in a Short-Dwell Coater Part II: Web Pressure Distribution and the Flow under the Blade", Proceedings of the TAPPI Coating Conference, Montreal, May, 1991, pp. 327-336.

H. Affes, **A. T. Conlisk**, J. M. Kim and N. M. Komerath "An Experimental and Analytical Study of the Interaction of a Vortex with an Airframe", paper 92-0319 30th AIAA Aerospace Sciences Meeting, Reno, Nev., January 1992.

H. Affes and **A. T. Conlisk**, "A Simplified Model for the Interaction of a Rotor-Tip Vortex with an Airframe", paper 92-0320, 30th AIAA Aerospace Sciences Meeting, Reno, Nev., January 1992.

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L. Chen and **A. T. Conlisk**, “Modeling of DNA Translocation in Nanopores”, AIAA paper 2009-1121, 47th AIAA Aerospace Sciences Meeting and Exhibit, January 5-8, 2009, Orlando, Florida.

S. Datta and **A. T. Conlisk**, “Role of Multivalent Ions and Electrical Double Layer Overlap in Electroosmotic Nanoflows”, AIAA paper 2009-1120, 47th AIAA Aerospace Sciences Meeting and Exhibit, January 5-8, 2009, Orlando, Florida.

S. Datta and **A. T. Conlisk**, “Fluid Flow and Solute Transport in the Permeate Channel of a Synthetic Nanomembrane”, AIAA Paper No. 2009-3820, 39th AIAA Fluid Dynamics Conference, San Antonio, TX, Jun. 2009.

Lei Chen and **A. T. Conlisk**, “Modeling of DNA Translocation through a Nanopore”, 10th US National Congress on Computational Mechanics, Columbus, OH, July, 2009.

Lei Chen and **A. T. Conlisk**, “Modeling of DNA and Particle Transport in Nanopores”, Ohio Innovation Summit, April 2009, Dayton, OH.

Y. Shin, L. Chen, A. Hassanali, H. Zhang, **A. Conlisk**, S. Singer, “Electrophoretic and electroosmotic phenomena in a nano-nozzle: A combined molecular and continuum theory study”, 10th US National Congress on Computational Mechanics Columbus, OH, July, 2009.

S. Datta and **A. T. Conlisk**, “Porescale transport phenomena in charge-selective hemofilters”, Oral presentation Annual Meeting of the Division of Fluid Dynamics, American Physical Society, Minneapolis, MN, Nov. 2009.

S. Datta, **A. T. Conlisk**, H. Li, and M. Yoda, “Ion-surface Interactions in Electroosmotic Flow”, 10th United States National Congress on Computational Mechanics, Columbus, OH, July, 2009.

S. Datta, **A. T. Conlisk**, H. Li, and M. Yoda, “Role of Divalent Cations in Electroosmotic Flow”, poster at The Ohio Innovation Summit, Dayton, OH, Apr. 2009.

A. T. Conlisk, “The Computational Fluid Dynamics of Micro and Nanoscale Devices”, held in conjunction with the Ohio Innovation Summit, Dayton, OH, April 20-23, 2009

L. Chen, S. Datta and **A. T. Conlisk**, Micro and Nanoscale Transport of Biomolecules through Nozzles and Pores (Invited). Poster at a workshop on ”Microfluidics:

Electrokinetic and Interfacial Phenomena” organized by Institute for Mathematics and its Applications at University of Minnesota, Minneapolis, MN, Dec. 2009.

Subhra Datta, **A. T. Conlisk**, William H. Fissell, Shuvo Roy and Jeff Majestrelli, “High Knudsen Number Fluid Flow at Near-Standard Temperature and Pressure Conditions using Precision Nanochannels”, American Physical Society Division of Fluid Dynamics, Long Beach, CA, Nov. 21-23, 2010.

Subhra Datta and **A. T. Conlisk**, “Electric Double Layers at Corners in Micro/ Nanofluidic Channels”, National and 4th International Conference on Fluid Mechanics and Fluid Power will be organized at Indian Institute of Technology Madras Dec 16-18 2010.

Zhizi Peng, Dan Hoying, and **A. T. Conlisk**, “Cell Transport in Microchannels”, American Physical Society Division of Fluid Dynamics, Long Beach, CA, Nov. 21-23, 2010.

J. Marcicki, G. Rizzoni, **A.T. Conlisk** and M. Canova, ”A Reduced-Order Electrochemical Model of Lithium-Ion Cells for System Identification of Battery Aging”, 2011 ASME Dynamic Systems and Control Conference, Arlington, VA, Oct. 31 - Nov. 2, 2011.

J. Marcicki,**A.T. Conlisk**, and G. Rizzoni, ”Current-Voltage Relationships for Batteries”, 220th Electrochemical Society Meeting and Electrochemical Energy Summit, Boston, MA, Oct. 9 - 14, 2011.

A. T. Conlisk and Minami Yoda, “Verification and validation in micro nanofluidics”, AIAA paper AIAA 2011-3393, 6thTheoretical Fluid Mechanics, Honolulu, Hawaii, June 2011.

A.T. Conlisk, Harvey Zambrano, and Zhizi Peng, “Multiscale study of nanoparticle-wall interactions in electroosmotic flow”, Annual Meeting of the Division of Fluid Dynamics, American Physical Society, Baltimore, MD, Nov. 2011.

Harvey Zambrano, Marie Pinti, Shaurya Prakash and **A. T. Conlisk**, “Electroosmosis in a potassium chloride aqueous solution confined in a silica nanochannel with counter-charged surface patches”, Annual Meeting of the Division of Fluid Dynamics, American Physical Society, San Diego, Nov. 2012.

A. T. Conlisk, Harvey Zambrano, Necmettin Cevheri and Minami Yoda, “Effect of divalent ions on electroosmotic transport in a sodium chloride aqueous solution

confined in an amorphous silica nanochannel”, Annual Meeting of the Division of Fluid Dynamics, American Physical Society, San Diego, Nov. 2012.

Shauna Adams, Cong Zhang, Harvey Zambrano and **A. T. Conlisk**, “Stochastic Analysis of Antibody-antigen Binding in a Microfluidic Device”, Annual Meeting of the Division of Fluid Dynamics, American Physical Society, San Diego, Nov. 2012.

James Marcicki, Alex Bartlett, Marcello Canova, **A.T. Conlisk**, Giorgio Rizzoni, Yann Guezennec, Xiao Guang Yang, Ted Miller, Characterization of Cycle-Life Aging in Automotive Lithium-Ion Pouch Cells, Presented at the 222nd Meeting of the Electrochemical Society, Oct. 12, 2012.

Cong Zhang, **A.T. Conlisk**, Giorgio Rizzoni, James Marcicki, Effects of Volume Expansion and Fluid-Solid Stress Interaction within Lithium-Ion Batteries, Presented at the 222nd Meeting of the Electrochemical Society, Oct. 9, 2012.

James Marcicki, Alex Bartlett, **A.T. Conlisk**, Giorgio Rizzoni, Xiao Guang Yang, Ted Miller, Robustness Evaluation for State-of-Charge and State-of-Health Estimation Considering Electrochemical Parameter Uncertainties, Proceedings of the American Control Conference, 2013.

Harvey Zambrano and **A.T. Conlisk**, “Controlling the Electroosmotic Transport in Nanochannels: Effect of Divalent Counter-ions”, 51st AIAA Aerospace Sciences Conference, January 2013, Grapevine (Dallas/Ft. Worth Region), Texas.

Shauna Adams, Cong Zhang, Harvey Zambrano and **A. T. Conlisk**, “Antibody-antigen Binding in a Flow-through Microfluidic Device”, 51st AIAA Aerospace Sciences Conference, January 2013, Grapevine (Dallas/Ft. Worth Region), Texas.

Cong Zhang and **A. T. Conlisk**, “Stresses Due To Relative Sliding Between Particles Surrounded By An Electrolyte Solution With Application To Lithium-ion Batteries”, Annual Meeting of the Division of Fluid Dynamics, American Physical Society, San Diego, Nov. 2012.

Cong Zhang and **A. T. Conlisk**, “Stresses Due To Relative Squeezing Between Particles Surrounded By An Electrolyte Solution With Application To Lithium-ion Batteries”, Annual Meeting of the Division of Fluid Dynamics, American Physical Society, San Diego, Nov. 2012.

SEMINARS

Source-Sink Flow in a Rapidly Rotating Annulus, Exxon Production Research, Houston, Texas, January, 1978.

Source-Sink Flow in a Rapidly Rotating Annulus, Clarkson College of Technology, Potsdam, New York, February, 1978.

Mass Transfer in a Rapidly Rotating Annulus, The University of Pennsylvania, Philadelphia, Pennsylvania, November, 1979.

Mass Transfer in a Rapidly Rotating Annulus, The Ohio State University, Columbus, Ohio, February 1980.

The Effect of Source-Sink Geometry on Enrichment in a Gas Centrifuge, The Ohio State University, Columbus, Ohio, November 1982.

Fundamentals of the Gas Centrifuge, Lawrence Livermore Laboratories, Livermore, California, May 22, 1984.

Singular Perturbation Problems in Fluid Mechanics, Department of Mathematics, Xavier University, Cincinnati, Ohio, April 25, 1986.

Tip Vortex-Boundary Collisions, NASA Lewis Research Center, Cleveland, Ohio, April 15, 1992.

Tip Vortex-Airframe Interactions, Lehigh University, Bethlehem, Pa., April 16, 1993.

An Asymptotic Approach to Vortex-Body Collisions, Georgia Institute of Technology, August 11, 1993.

Boundary Layer Methods for Absorber Design, Oak Ridge National Laboratories, June 28, 1994.

GAX Absorber and System Design, Oak Ridge National Laboratories, January 5, 1995.

Vortex-Surface Collisions, NASA Ames, Mountainview, California, May 1, 1995.

Vortex-Surface Collisions, The University of Notre Dame, Notre Dame, Indiana, September 15, 1995.

New Results Regarding Vortex-Surface Collisions, NASA Ames, Mountainview, California, May, 1996.

Vortex-Surface Collisions, United Technologies Research Center, East Hartford, Connecticut, August 20, 1997.

Vortex-Surface Collisions, University of Tennessee Space Institute, December 1, 1998.

The Near Wake of a Rotor, July 20, 1999, School of Aerospace Engineering, Georgia Institute of Technology, Atlanta, Georgia.

Modeling of Vortex-Airframe Interaction, November 12, 1999, Sikorsky Aircraft Corporation, Stratford, Connecticut.

Microfluidics, BioMEMS and Biomedical NANO technology 2000, September 23, 2000, Columbus, Ohio.

Microfluidics, BioMEMS and Biomedical NANO technology 2001, September 22, 2001, Columbus, Ohio.

Mass Transfer and Flow in Electrically Charged Micro- and Nano-channels, Oak Ridge National Labs, April 22, 2002.

Electroosmotic Flow in Micro- and Nano Channels, OSU Aerospace Engineering, October 18, 2002.

Electroosmotic Flow in Nano Channels, Biomedical Engineering Program, OSU, Jan 28, 2003.

Electroosmotic Flow in Nano Channels, University of Illinois, Beckmann Institute, March 3, 2003.

Electroosmotic Flow in Nano Channels, Georgia Institute of Technology, April 1, 2003.

Modeling and Experiments of Ionic and Biomolecular Transport in Micro and Nanochannels, Army Research Laboratory, Aberdeen Proving Ground, January 29, 2004. With Minami Yoda.

“Ionic and Biomolecular Transport in Nanofluidic Devices”, University of Illinois, September 17, 2004.

“The Long-time Structure of the Rotor Wake in Ground Effect”, Sikorsky Aircraft Corporation, Stratford, CT, October 15, 2004.

“Ionic and Biomolecular Transport in Nanofluidic Devices”, Lehigh University, November 5, 2004.

“Electrokinetic Transport: Issues for the Design of Micro and Nanofluidic Biomedical Devices”, Tennessee Tech University, September 7, 2006.

“Engineering Biology: The Role of Micro/nanofluidics in the Science of Biomedical Devices”, University of Notre Dame, October 17, 2008.

RESEARCH CONTRACTS

R. N. Christensen(PI) and **A. T. Conlisk**, “Experimental and Analytical Study of the Thermal Aspects of Deep Geological Disposal of Commercial Nuclear Wastes” Office of Nuclear Waste Isolation/DOE, \$200,000, October 1980 to September 1981. Responsible for TASK II Modelling of a Nuclear Waste Repository.

R. N. Christensen(PI), D. R. Richards and **A. T. Conlisk**, “Boiling and Condensation in Tubular Heat Exchangers” Columbia Gas Corporation, \$670,000, October 1982 to September 1984, EES 312757. Responsible for modeling the surface-tension driven flows in the heat exchanger and modeling and design of a double-effect generator.

A. T. Conlisk(PI), “Sound Generated by the Interaction of a Vortex Array with an Edge”, The Ohio State University, Small Research Grant, \$7,500, October 1983 to June 1984.

A. T. Conlisk(PI) and R. N. Christensen(Co-PI), “Analytical and Experimental Investigation of Evaporation of NH₃-H₂O Solutions from Vertical Fluted Surfaces, Phase 1”, Gas Research Institute, \$36,000, January 1985 to May 1985, EES 312834.

A. T. Conlisk(PI) and R. N. Christensen(Co-PI), “Analytical and Experimental Investigation of Evaporation of Lithium Bromide-Water Solutions from Vertical Fluted Surfaces, Phase 2”, Gas Research Institute, \$90,000, June 1985 to March 1986, EES 312834.

A. T. Conlisk(PI), “Vortex Motion Past a Cavity with Elastic Obstructions”, David Taylor Naval Ship Research and Development Laboratory, \$147,000, April 1986 to April 1989, RF 718220.

A. T. Conlisk(PI), M. R. Foster, M. Khonsari, and B. J. Hamrock, “Investigation

of Roll Coating Operations in the Paper Industry,” Energy Research Center for Net Shape Manufacturing, \$8,258, April 1987 to March 1988, RF 719318.

A. T. Conlisk(PI), “Boundary Layers Induced by Three-Dimensional Vortex Loops”, Army Research Office, Engineering Sciences Division \$163,004, May 1989 to April 1992, RF722045.

A. T. Conlisk(PI) and R. J. Bodonyi(Co-PI), “Workshop on Analytical Methods in Unsteady Separation”, Army Research Office, Engineering Sciences Division, \$7,507, October 1989 to September 1990, RF722827.

A. T. Conlisk(PI), “Boundary Layers Induced by Three-Dimensional Vortex Loops”, Army Research Office, Engineering Science Division \$72,684, May 1992 to April 1993, one year extension of RF722045. Proposal required.

A. T. Conlisk(PI), “Novel Computational Techniques for Boundary Layers Induced by Three- Dimensional Vortex Loops”, Army Research Office, Engineering Sciences Division \$74,308 June 1992 to October 1995, RF722827.

A. T. Conlisk(PI) and N. M. Komerath(Co-PI), “Vortex-Surface Collisions”, Army Research Office, Engineering Sciences Division \$432,000, May 1993 to April 1996, RF727272.

A. T. Conlisk(PI), “Falling Film Heat and Mass Transfer on a Horizontal Cylindrical Tube”, Martin Marietta Energy Systems, \$77,430, December 1993 to June 1995, RF728615.

A. T. Conlisk(PI) and N. M. Komerath(Co-PI), “Vortex-Surface Collisions”, Army Research Office, Engineering Sciences Division \$120,000, May 1996 to April 1997, one year extension of RF727272. Proposal required.

A. T. Conlisk(PI), Dimensional Analysis and Interaction Effects in Rotorcraft Design”, Georgia Tech Center of Excellence in Rotorcraft Technology, \$49,000, January 1996 to December 1997, RF732865.

A. T. Conlisk(PI) and N. M. Komerath(Co-PI), “The Origin and Structure of Vortices in Aerodynamics”, Army Research Office, Engineering Sciences Division, \$367,750, May 1997 to April 2000, RF733920.

A. T. Conlisk(PI), “Dimensional Analysis and Interaction Effects in Rotorcraft Design”, Georgia Tech Center of Excellence in Rotorcraft Technology, \$30,000, January 1997 to December 1998, RF732865. Proposal required.

A. T. Conlisk(PI), “Dimensional Analysis and Interaction Effects in Rotorcraft Design”, Georgia Tech Center of Excellence in Rotorcraft Technology, \$30,000, January 1999 to December 1999, RF732865. Proposal required.

A. T. Conlisk(PI), “Dimensional Analysis and Interaction Effects in Rotorcraft Design”, Georgia Tech Center of Excellence in Rotorcraft Technology, \$30,000, January 2000 to December 2000, RF732865. Proposal required.

A. T. Conlisk(PI), “Wakes of Rotorcraft Maneuvering in Ground Effect”, Georgia Tech Center of Excellence in Rotorcraft Technology, \$190,000, January 2001 to May 2006, RF740338.

A. T. Conlisk(PI), “Modeling of Ground Effect Flows for Handling Qualities”, RITA, \$25,000, January 2001 to December 2001.

A. T. Conlisk(PI), “Experimental and Theoretical Development of Bio-Fluid Models through Nano-and Microfluidic Components”, DARPA, June 2000-December 2003, RF742684, \$950,000.

A. T. Conlisk(Co-PI), “ Aerodynamic Drag of Trailer Trucks”, Center for Automotive Research, The Ohio State University, \$56,000, January 2001 to December 2001.

A. T. Conlisk(Co-PI), “Biologically Enabled Synthesis of Ceramic Microdevices”, AFOSR, MURI, Ken Sandhage, PI, \$5,000,000, May 1, 2003-April 30, 2008, Conlisk portion, \$330,000, August 2003-August 2008.

A. T. Conlisk(Co-PI), “ Center for Affordable Nanoengineering of Polymeric Biomedical Devices”, NSF NSEC, L. J. Lee PI, \$12,700,000, October 1, 2004 -September 30, 2009.

A. T. Conlisk(PI), “Transient Biomolecular Transport in Nanochannels”, NSF, \$42,819, October 1, 2004-September 30, 2006.

A. T. Conlisk(PI), “An REU Site for the Center for Affordable Nanoengineering of Polymeric Biomedical Devices”, NSF, \$120,000, May 2005-September 2006.

A. T. Conlisk(PI), “Nano and Microscale Biofluid Transport with Applications to Biomolecular Sensing”, Workshop held at Army Research Laboratory, October 3,4, 2005, workshop organizer, Army Research Office, \$12,183, May 1, 2005-January 31, 2006.

A. T. Conlisk(Co-PI), “Microfluidic Chemical and Biological Sensors”, Battelle Memorial Institute, \$77,065. August 2007-December 2008.

A. T. Conlisk(Co-PI), “Miniaturized Implantable Renal Assist Device for Total Renal Replacement”, Shuvo Roy, Cleveland Clinic Foundation PI. September 1, 2007-August 31, 2010, NIH, \$310,792.

A. T. Conlisk(Co-PI), “Center for Affordable Nanoengineering of Polymeric Biomedical Devices”, NSF NSEC, L. J. Lee PI, \$12,700,000, Phase II, October 1, 2009 -September 30, 2014.

A. T. Conlisk(Co-PI), “Transport of Multivalent Electrolyte Mixtures in Micro- and Nanochannels”, with Minami Yoda, Army Research Office, 8/1/2010-7/31/2013, \$532,500.

PATENTS AND LICENSES

A. T. Conlisk, “Microfluidic Chemical and Biological Sensors” , Battelle Memorial Institute, software license, August 14, 2007.

D. J. Hansford, R. J. Walczak, A. A. Boiarski, and **A. T. Conlisk**, “Nanopump Devices and Methods”,U.S. Patent No. 7,799,197, September 21, 2010.

A. T. Conlisk, Subhra Datta, Shuvo Roy and William H. Fissell, “Selective Ultrafiltration Membranes for Renal Replacement Therapies”, U. S. Patent No. 9,737,653B2, August 22, 2017.