

CURRICULUM VITAE

William H. Cliff

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Professional Experience

2019 - present	Director Program in Public Health Niagara University
2017 - present	Member Rose Bente Lee Ostapenko Center for Ethics in Medicine and Healthcare
2010 – present	Professor of Biology Niagara University
2007 - present	Visiting Professor of Physiology and Biophysics SUNY Buffalo School of Medicine and Biomedical Sciences
2016 - 2023	John J. Hughes, '67, M.D. Endowed Director Pre-Health Professions Program Niagara University
2001- 2018	Investigative Member Physiology Educational Research Consortium
1998 - 2009	Associate Professor of Biology Niagara University
1995-2007	Adjunct Assistant Professor of Physiology and Biophysics SUNY Buffalo School of Medicine and Biomedical Sciences
Fall 2000	Visiting Associate Professor of Cell Biology and Physiology University of Pittsburgh School of Medicine
1992 - 1998	Assistant Professor of Biology Niagara University
1988 - 1992	Postdoctoral Fellow

University of Alabama at Birmingham

1981 - 1987

Graduate Student - Cornell University

1979 - 1981

Research Technician - USDA/Cornell University

Summers 1978/1979

Biological Technician
NOAA/National Marine Fisheries Service

Education

<u>Degree</u>	<u>Year</u>	<u>University</u>	<u>Major</u>
Ph.D.	1988	Cornell University	Physiology
B.S.	1979	Cornell University	Biological Sciences

Professional Honors and Awards:

2017	Niagara University College of Arts and Sciences Excellence in Scholarship
2016	Fund for the Improvement of Teaching. Interdisciplinary project on human interaction with Niagara Falls (pilot project for Discover Niagara) with Drs. Jamie Carr and Paula Kot (English), and Tom Chambers (History)
2013	Niagara University – Excellence in Teaching Finalist
2007	American Physiological Society - Teaching Career Enhancement
2002	Niagara University Research Council Summer Fellowship
2000-2001	Carnegie Scholar - Pew National Fellowship Program
1998	Project Kaleidoscope Faculty for the 21 st Century (Class of 1998)
1993-1999	NU Research Council Summer Fellowships
1987	Cornell Graduate School Summer Fellowship
1986-87	Outstanding Teaching Assistant in Physiology
1986	Sigma Xi Grant-in-Aid of Research
1985-86	Cornell University Graduate Student Travel Grants (4)
1982	Wiegand Fellowship in Biological Sciences (Cornell University)
1982	Honorary mention, NSF Graduate Fellowship

Publications (* peer reviewed)

Cliff, W.H. Teaching with core concepts to facilitate the integrated learning of introductory organismal biology. *Adv. Physiol. Edu.* 47 (3):562-572, 2023 doi: 10.1152/advan.00134.2022, 2023.*

Michael, J., P. Martinkova, J. McFarland, A. Wright, W. Cliff, H. Modell, and M P. Wenderoth. Validating a conceptual framework for the core concept of “cell-cell communications” *Adv. Physiol. Edu.* 41:260-265, 2017.*

McFarland, J., R.M. Price, M P. Wenderoth, P. Martinkova, W. Cliff, J. Michael, H. Modell, and A. Wright. Development and validation of the homeostasis concept inventory. *CBE-Life Sci. Educ.* 16(2) :ar35 DOI:10.1187/cbe.16-10-0305, 2017. *

Blatch, A., W. Cliff, B. Beason-Abmayr, and P.A. Halpin. The fictional animal project: A tool for helping students integrate body systems. *Adv. Physiol. Edu.* 41:239-243, 2017.*

McFarland J., M.P. Wenderoth, J. Michael, W. Cliff, A. Wright, and H. Modell. A conceptual framework for homeostasis: development and validation. *Adv. Physiol. Edu.* 40: 213-222, 2016.*

Modell H, W. Cliff, J. Michael, J. McFarland, M.P. Wenderoth, and A. Wright. A physiologist's view of homeostasis. *Adv Physiol Educ.* 39:259-266, 2015.*

Taylor A.S. and W. Cliff. One headache after another... case study on Topomax inhibition of carbonic anhydrase. Online at the National Center for Case Study Teaching in Science Case Collection. <https://www.nsta.org/ncss-case-study/one-headache-after-another-physiology-edition>, published 12/28/2009.*

Cliff W. Chemistry misconceptions associated with understanding calcium and phosphate homeostasis. *Adv. Physiol. Educ.* 33:323-328, 2009.*

Michael J., H. Modell, J. McFarland and W. Cliff. The “core principles” of physiology: What should students understand? *Adv. Physiol. Educ.* 33:10-16, 2009.*

Cliff, W., S. Freeman, P.A. Hansen, J.D. Kibble, M. Peat and M.P. Wenderoth. Is formative assessment an effective way to improve learning? *Adv. Physiol. Educ.* 32:337-338, 2008.

Nesbitt, L.M. and W.H. Cliff. How the story unfolds: exploring ways faculty develop open-ended and closed-ended case designs. *Adv. Physiol. Educ.* 32:279-285, 2008.*

Cliff, W.H. Case study analysis and the remediation of misconceptions about respiratory physiology. *Adv. Physiol. Educ.* 30: 215-223, 2006.*

Cliff, W.H. Case-based learning of blood oxygen transport. Adv. Physiol. Educ. 30: 224-229, 2006.*

Cliff, W.H. and A.W. Wright. A friend in need is a friend indeed: a case study on human respiratory physiology. J. College Science Teaching 35:37-39, 2005.*

Online in the National Center for Case Study Teaching in Science Case Collection
<https://www.nsta.org/ncss-case-study/friend-need-friend-indeed>

Cliff, W.H. and L. Nesbitt. Open or shut case? Contrasting approaches to case study design. J. College Science Teaching 34:14-17, 2005.*

Michael, J.A., M.P. Wenderoth, H.I. Modell, W. Cliff, B. Horowitz, P. McHale, D. Richardson, D. Silverthorn, S. Williams, and S. Whitescarver. Undergraduates' understanding of cardiovascular phenomena. Adv. Physiol. Educ. 26:72-84, 2002.*

Cliff, W.H. and L. Nesbitt-Curtin. The directed case method: teaching concept and process in a content-rich course. J. College Science Teaching 30:64-66, 2000.*

Cliff, W.H., M. E. Duffey and N. Packianathan. Acetylcholine-activated chloride current in the T84 colonic cell line. European J. Physiol. 436:90-94, 1998.*

Cliff, W.H., L. Nesbitt-Curtin, and A.W. Wright. Physiologia and poesis: Combining left and right brain approaches to learning anatomy and physiology. Am. J. Physiol. 273 (Adv. Physiol. Educ. 18): S138-S139, 1997.*

Cliff, W.H. and A.W. Wright. Directed case study method for teaching human anatomy and physiology. Am. J. Physiol. 270 (Adv. Physiol. Educ. 15): S19-S28, 1996.*

Cliff, W.H., R.A. Schoumacher, and R.A. Frizzell. cAMP-activated Cl channels in CFTR-transfected cystic fibrosis pancreatic epithelial cells. Am. J. Physiol. 262 (Cell Physiol. 31): C1154-C1160, 1992.*

Cliff, W.H. and K.W. Beyenbach. Secretory renal proximal tubules in seawater- and freshwater-adapted killifish. Am. J. Physiol. 262 (Renal Fluid Electrolyte Physiol. 31): F108-F116, 1992.*

Drum, M.L., H.A. Pope, W.H. Cliff, J.M. Rommens, S.A. Marvin, L-C. Tsui, F.S. Collins, R.A. Frizzell and J.M. Wilson. Correction of the cystic fibrosis defect in vitro by retrovirus-mediated gene transfer. Cell 62:1227-1233, 1990.*

Cliff, W.H. and R.A. Frizzell. Separate Cl⁻ conductances activated by cAMP and Ca²⁺ in Cl-secreting epithelial cells. Proc. Natl. Acad. Sci. USA 87: 4956-4960, 1990.*

Worrell, R.T., A.G. Butt, W.H. Cliff and R.A. Frizzell. A volume-sensitive anion conductance in the human colonic cell line T84. Am. J. Physiol. 256 (Cell Physiol. 25): C1111-C1119, 1989.*

Cliff, W.H. and K.W. Beyenbach. Fluid secretion in glomerular renal proximal tubules of freshwater-adapted fish. Am. J. Physiol. 254 (Regulatory Integrative Comp. Physiol. 23): R154-R158, 1988.*

Cliff, W.H., D.B. Sawyer and K.W. Beyenbach. Renal proximal tubule of flounder. II. Transepithelial Mg secretion. Am. J. Physiol. 250 (Regulatory Integrative Comp. Physiol. 19): R616-R624, 1986.*

Beyenbach, K.W., D.H. Petzel and W.H. Cliff. Renal proximal tubule of flounder. I. Physiological properties. Am. J. Physiol. 250 (Regulatory Integrative Comp. Physiol. 19): R608-R615, 1986.*

Cliff, W.H., K.W. Beyenbach and D.H. Petzel. Contractile actions of isolated renal tubules of the winter flounder (Pseudopleuronectes americanus). Bull. Mt. Desert Island Biol. Lab. 22: 62-63, 1982.

Books

Michael, J., Cliff, W., McFarland, J., Modell, H., Wright, A. The Core Concepts of Physiology. Springer, 2017. ISBN 978-1-4939-6909-8

Book Chapters and Reviews (* peer reviewed)

Cliff, W. Remembrances of Dr. John M. Kingsbury (1977-1979). IN: In Memoriam John M. Kingsbury 1928-2023. Shoals Marine Laboratory. Issuu, Palo Alto CA, 2023, p. 22-23. https://issuu.com/shoalsmarinelab/docs/tribute_final_1?fr=sNzZiNzYzMzI2MDI

Cliff, W. Case-based learning engages cognitive and affective aspects of student learning in the sciences. IN: Case Studies in Active, Integrative Learning. Teaching Innovations That Make a Difference. Paula Kot, Ed. Cambria Press, Amherst NY, 2011, p. 39-52. *

Cliff, W.H. and L. Nesbitt-Curtin. The directed case method: teaching concept and process in a content-rich course. IN: Start with a Story. The Case Study Method of Teaching College Science Teaching. Clyde Freeman Herreid, Ed. NSTA Press, Arlington VA, 2007, p. 301-305.

Cliff, W.H. and L. Nesbitt. Open or shut case? Contrasting approaches to case study design. IN: Start with a Story. The Case Study Method of Teaching College Science Teaching. Clyde Freeman Herreid, Ed. NSTA Press, Arlington VA, 2007, p. 375-379.

Frizzell, R.A. and W.H. Cliff. No common motif. Current Biology 2(6):285-287, 1992.*

Frizzell, R.A. and W.H. Cliff. Back to the chloride channel. Nature 350:277-278, 1991.*

Cliff, W.H., R.T. Worrell, A.P. Morris and R.A. Frizzell. Conductance pathways involved in chloride secretion and their regulation. IN: The Identification of the CF (Cystic Fibrosis)

Gene: Recent Progress and New Research Strategies, (Adv. Exp. Med. Biol., Vol. 290), Tsui, L-C., G. Romeo, R. Greger and S. Gorini, Eds., Plenum Publishing, New York, 1991, p.197-208.

Published Abstracts

Michael, J., J. McFarland, A. Wright, H. Modell, and W. Cliff. Unpacking the core concept of cell-cell communications for undergraduate or professional level physiology courses. The Physiologist. 59(6):20, 2016.

Michael, J., W. Cliff, J. McFarland, A. Wright, H. Modell, and P. Martinkova. A conceptual framework for the core concept of cell-cell communications. FASEB J. 30:553.20, 2016.

Cliff, W., K. Hull, S. Blatch, P.A. Halpin, and B. Beason-Abmayr. Core competencies in animal physiology. FASEB J. 29:541.32, 2015.

McFarland, J., M.P. Wenderoth, J. Michael, H. Modell, A. Wright, and W. Cliff. A homeostasis concept inventory for undergraduate physiology. FASEB J. 29:541.33, 2015.

Wright, A., J. McFarland, M.P. Wenderoth, J. Michael, H. Modell, and W. Cliff. Knowing common misconceptions about homeostasis helps student learning. FASEB J. 29:541.34, 2015.

Cliff, W. Case-based learning. The Physiologist. 57(6):347, 2014.

Wright, A., J. Michael, J. McFarland, H. Modell, W. Cliff, and M. Wenderoth. What visual representations of homeostasis do faculty use? FASEB J. 28:531.14, 2014.

McFarland, J., J. Michael, M. Wenderoth, H. Modell, A. Wright, and W. Cliff. Conceptual assessment of physiology: development of a concept inventory for homeostasis. FASEB J. 28:531.13, 2014.

Wright, A., J. McFarland, W. Cliff, J. Michael, H. Modell, and M. Wenderoth. Preliminary results on the prevalence of physiology students' homeostatic misconceptions. FASEB J. 27:739.5, 2013.

Michael, J., J. McFarland, W. Cliff, H. Modell, M. Wenderoth, and A. Wright. Homeostasis in undergraduate physiology textbooks. FASEB J. 27:739.4, 2013.

Cliff, W. Backward design helps faculty develop case studies. FASEB J. 26:720.3, 2012.

McFarland, J., J. Michael, M. Wenderoth, H. Modell, A. Wright and W. Cliff. Conceptual frameworks and misconceptions associated with the core principles of physiology, including homeostasis. FASEB J. 26:720.4, 2012.

Cliff, W. Case based learning of high altitude acclimatization promotes integrative

understanding of physiology. FASEB J. 25:672.2, 2011.

Cliff, W. and Gallo, M. Study nature, not books: Helping undergraduates rediscover nature study. NAAEE Annual Conference, p. 38, 2010.

Cliff, W.H. Impact of teleological thinking on student understanding of physiology. FASEB J. 23: 632.12, 2009.

Cliff, W. Concept mapping as a window into student understanding. FASEB J. 22, S197, 2008.

Nesbitt, L and Cliff, W. Faculty design of open-ended and closed-ended case studies. FASEB J. 21, A221, 2007.

Cliff, W. Students endorse case-based learning in human anatomy and physiology. FASEB J. 20: A864, 2006.

Cliff, W. and W. Schlegel. Implementing case-based pedagogies in the natural sciences. 2nd Annual Conference. ISSOTL. 202.1, 2005.

Schlegel, W., L. Hodges, and W. Cliff. Case-based pedagogies enhance understanding by engaging both cognitive and affective aspects of student learning. 2nd Annual Conference. ISSOTL. 506.1, 2005.

Cliff, W. Chemistry misconceptions associated with understanding of the skeletal system in calcium homeostasis. FASEB J. 19: A224, 2005.

Cliff, W. Using concept mapping to assess understanding of cardiovascular physiology. FASEB J. 18:300.6, 2004.

Duffey, M.E., M. Katzer, S. John, A. Turnbull, W.H. Cliff, M. Morales, and R.L. Rasmusson. The ancillary subunit KCNE3 modulates Ba²⁺ block of KCNQ1 K⁺ channels in liver duct cells. FASEB J. 18 (2004). LB472.

Hubbard, R. and W. Cliff. Stimulation of potassium channels in liver duct cells by forskolin and ionomycin. 58th Annual Eastern Colleges Science Conference, Manhattan College, Riverdale, NY, 2004.

Duffey, M.E., M. Katzer, S. John, M. Piette, A. Turnbull, W.H. Cliff, M. Morales, R.L. Rasmusson. Taurodeoxycholate (TDC) activates K⁺ channels in liver duct cells. Biophys. J. 86(2): 3043-Pos, 2004.

Cliff, W. From teaching innovation to effective assessment. Symposium entitled Collaboration, Active Learning and Self-Study Research: Reflections on the Change Process in an Education Community. Northeastern Education Research Association 34th Annual Conference, 2003.

Duffey, M.E., S. John, M. Piette, A. Turnbull, H.M. Jones, W.H. Cliff, Y.T. Zhu, and M.P. Lance. VIP and bile acids activate K^+ channels in liver duct cells. FASEB J. 17(5): A916, 2003.

Turnbull, A, H. Jones, M. Duffey, and W. Cliff. Detection and functional expression of the cAMP-activated potassium channel in a liver cell line. 57th Annual Eastern Colleges Science Conference, Ithaca College, Ithaca, NY, 2003.

Cliff, W., M.P. Wenderoth, and J. Michael. Probing student understanding of glomerular filtration. FASEB J. 17:A816, 2003.

Wenderoth, M.P., W. Cliff, and J. Michael. Undergraduate understanding of general models and renal physiology. FASEB J. 17:A383, 2003.

John, S., M. Piette, A. Turnbull, H.M. Jones, W.H. Cliff, and M.E. Duffey. VIP activates K^+ channels in liver duct cells. Biophys. J. 84(2): 2594-Pos, 2003.

Cliff, W.H. and L. Nesbitt. Open-ended and closed-ended approaches to the design of case studies. HAPS Conference 16: 28, 2002.

Cliff, W.H. Case study analysis and the remediation of misconceptions about respiratory physiology. FASEB J. 16: A753, 2002.

Jones, H.M., W. Cliff, M.P. Moyer, P. Lance, and M.E. Duffey. Cell swelling activates Ca^{2+} -insensitive Cl^- currents in NCM460 cells. FASEB J. 16: A481, 2002.

Cliff, W.H. Case study analysis and the remediation of misconceptions about human physiology. National Conference on Higher Education, AAHE Annual Meeting, March 2002.

Cliff, W.H. Inhibition of calcium-activated chloride conductance (CACC) in T84 cells by chloride channel blockers. FASEB J. 14: A334, 2000.

Burgio, M., P. Vermette and W. Cliff. Teaching human anatomy and physiology to high school students via case study analysis. HAPS Conference 14: 33, 2000.

Cliff, W.H. The biology senior seminar: intellectual and practical preparation for a career in the life sciences. PKAL Tenth Anniversary National Assembly. October 1999.

Burgio, M., P. Vermette and W. Cliff. Case studies in human anatomy and physiology increase student learning in high school students. 53rd Annual Eastern Colleges Science Conference, Sacred Heart University, Fairfield, CT, P35, 1999.

Cliff, W.H. Using case studies to teach human anatomy and physiology. HAPS Mid Atlantic Conference, October 1998.

Cliff, W.H. and N. Packianathan. Acetylcholine-activated chloride current in the T84 colonic cell line. Mol. Biol. Cell Suppl. 8:190A, 1997.

Cliff, W.H. Calcium-activated very low conductance chloride channels in the T84 secretory epithelial cell line. Univ. Buffalo Dept. Physiology Research Day, Dec. 1997.

Cliff, W.H. Directed case study method for teaching human anatomy and physiology. FASEB J. 11:1290, 1997.

Cliff, W.H. Directed case study method for teaching human anatomy and physiology. HAPS Conference (10): workshops 41&42, 1996.

Packianathan, N. and W.H. Cliff. Acetylcholine-activated Cl channels in a secretory intestinal cell line. 50th Annual Eastern Colleges Science Conference, Lycoming College, Williamsport, PA, 1996.

Izu, L., R. DeMuro, S. McCulle, W. Cliff and M. Duffey. Cl⁻ channels in T84 secretory cells are directly activated by a G protein and Ca²⁺. OWNYICG Abstr. 5:4, 1994.

Cliff, W.H., and R.A. Frizzell. Isozyme-selective PDE inhibitors differentially activate CFTR-associated Cl currents in Xenopus oocytes. FASEB J. 7:2054, 1993.

Cliff, W.H., and R.A. Frizzell. Adenosine activation of Cl conductance in T84 epithelial cells is mediated by cAMP-dependent protein kinase. FASEB J. 6:1744, 1992.

Cliff, W.H., R.A. Schoumacher and R.A. Frizzell. Regulation of chloride conductance in CFTR-expressing pancreatic epithelial cells. Ped. Pulm. Suppl. 6:172-173, 1991.

Cliff, W.H., R.A. Schoumacher and R.A. Frizzell. cAMP-activated Cl channels in CFTR-transfected CFPAC -1 cells. FASEB J. 5:8073, 1991.

Cliff, W.H. and R.A. Frizzell. cAMP activates a Cl conductance with properties different from the outwardly-rectified Cl channel. Ped. Pulm. Suppl. 5:108, 1990.

Cliff, W.H., R.T. Worrell and R.A. Frizzell. Chloride transport in cystic fibrosis. J. Cell. Biochem. Suppl. 14E: 14, 1990.

Cliff, W.H. and R.A. Frizzell. cAMP- and Ca-mediated regulation of Cl conductances in the human colonic cell line T84. Ped. Pulm. Suppl. 4:45, 1989.

Cliff, W.H. and R.A. Frizzell. Regulation of chloride channels in salt-secreting epithelia. 2nd Intl. Conf. Gastroenteric Biol., Chicago, IL, 1989.

Cliff, W.H. and R.A. Frizzell. Adenosine increases Cl conductance in T84 epithelial cells. FASEB J. 3:5355, 1989.

Cliff, W.H. and K.W. Beyenbach. cAMP stimulated fluid secretion in proximal tubule of freshwater killifish. I.U.P.S. Satellite Symposium on Membrane Transport and Control: Comparative Mechanisms, Banff, Canada, 1986.

Cliff, W.H. and K.W. Beyenbach. Fluid secretion by glomerular proximal tubules of euryhaline fish in freshwater. Proc. I.U.P.S., XXX Congress, Vancouver, Canada, 16:481, 1986.

Cliff, W.H. and K.W. Beyenbach. Fluid secretion by proximal tubules of euryhaline teleost in seawater. Physiologist 28(4):367, 1985.

Cliff, W.H. and K.W. Beyenbach. Transepithelial MgCl secretion and NaCl secretion drive fluid secretion in flounder renal proximal tubules. Vth European Colloquium on Renal Physiology, Frankfurt, W. Germany, June, 1985.

Cliff, W.H., D.B. Sawyer, M.M. Wilhelm and K.W. Beyenbach. Coupling of tubular Mg transport to NaCl transport? Kidney Int. 27:306, 1985.

Cliff, W.H. and K.W. Beyenbach. Picoliter rates of perfusion are necessary to elucidate the mechanism of Mg secretion in isolated flounder proximal tubules. Fed.Proc.44:8780, 1985.

Popular Press

Cliff, W. Sun and Rocks by Charles Burchfield: Total Solar Eclipse and Astral Visions at the Burchfield Penney Art Center Through June 2024. Artvoice. May 10, 2024. <https://artvoice.com/2024/05/sun-and-rocks-by-charles-burchfield-total-solar-eclipse-and-astral-visions-at-the-burchfield-penney-art-center-through-june-2024/>

Cliff, W. Burchfield's visions of eclipse worth seeing. Buffalo News. My View. p. F2, March 31, 2024.

also: Cliff, W. Channel Burchfield to thoroughly appreciate the April 8 eclipse. Buffalo News. https://buffalonews.com/opinion/my-view-channel-burchfield-to-thoroughly-appreciate-the-april-8-eclipse/article_50f09408-ec5e-11ee-8be4-6b457ad2327a.html.

Cliff, B. 'Under The Spell of Its Weirdness' – Charles Burchfield Records His Impressions of a Partial Solar Eclipse. Artvoice. March 22, 2024. <https://artvoice.com/2024/03/under-the-spell-of-its-weirdness-charles-burchfield-records-his-impressions-of-a-partial-solar-eclipse/>

also: <https://niagarafallsreporter.com/under-the-spell-of-its-weirdness-charles-burchfield-records-his-impressions-of-a-partial-solar-eclipse/>

Educational Texts/Tools

Cliff, W.H. and Wright, A.W. Case Studies in Human Anatomy and Physiology. Benjamin

Cummings, 2004. ISBN-13: 9780130843128.

Cliff, W.H. Human Anatomy and Physiology Case Study Project.
<http://faculty.niagara.edu/bcliff>.

Wright, A.W., Nesbitt-Curtin, L. and W.H. Cliff. Lab Manual for Human Physiology (Biology 231), 5th Ed., 2000.

Wright, A.W., Nesbitt-Curtin, L. and W.H. Cliff. Lab Manual for Human Physiology (Biology 232), 5th Ed., 2000.

Invited Symposia, Workshops, Lectures and Presentations

“Assessing Student Understanding of the Core Concepts of Flow Down Gradients and Mass Balance” Presenter and workshop leader. American Physiological Society’s Center for Physiology Education Pre-Summit Educator Conference – From Concept to the Classroom. Long Beach CA, April 2024.

“Shaping Curricula Around the Core Concepts” Webinar facilitator. Center for Physiology Education Month of Learning Webinar Series. American Physiological Society. October 2023.

“Vaccine Mandates from a Public Health Perspective” Panel member and presenter. Ethics of Vaccine Mandates: A Panel Discussion. The Ostapenko Center for Ethics in Medicine and Healthcare. Niagara University. October 2021.

“Ethical Issues and Medical Mission Trips: A Panel Discussion” Panelist. The Ostapenko Center for Ethics in Medicine and Healthcare. Niagara University. February 2020.

“Undergraduate Health Care Service Learning in Central America” Poster presenter. Global Health Symposium, Jacobs School of Medicine and Biomedical Sciences, Buffalo, NY, November 2019.

"A Backward Approach to Designing Case Studies." Workshop leader. Annual National Conference on Case Study Teaching in Science, University at Buffalo, Buffalo NY, September 2019.

“The Spirituality of Niagara Falls” Panel Member and Presenter. Castellani Art Museum of Niagara University. September 2019.

Case Studies in Science Summer Workshop. Speaker and workshop facilitator. National Center for Case Study Teaching in Science. University at Buffalo, Buffalo NY, May and June 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2018, 2019.

“Undergraduate Health Care Service Learning in Central America” Poster presenter. Global Health Symposium, Jacobs School of Medicine and Biomedical Sciences, Buffalo, NY, November 2018.

"Case Based Learning in the Biomedical Sciences." Workshop leader. Annual National Conference on Case Study Teaching in Science, University at Buffalo, Buffalo NY, September 2017.

“Why Restore the Niagara Gorge?” Panel member and presenter. Castellani Art Museum of Niagara University. September 2017.

“Start with a Story. Incorporating Case Studies in the Classroom” Workshop leader and presenter. Monroe Community College. Winter Teaching Institute. Rochester, NY, January 2017.

“The Discovery Niagara Project: An Interdisciplinary Approach” Presentation with P. Kot, J. Carr and T. Chambers. 16th Annual International Conference on Teaching and Learning. Niagara University, Lewiston, NY, January 2017.

“Case Studies: Teaching for Relevance and Engagement” Roundtable with R. Kane and Goacher. 16th Annual International Conference on Teaching and Learning. Niagara University, Lewiston, NY, January 2017.

“Helping Faculty Put Case-Based Learning into Practice in their Biology Classrooms.” Workshop leader and presenter. Making Biology Relevant to our Students: Strategies for Engagement. 34th Annual Conference of Empire State Association of Two Year College Biologists. Middletown, NY, April 2016.

“Case-Based Learning in Practice.” Workshop leader and presenter. Annual Lecture on Teaching and Learning. Department of Human Physiology, University of Oregon, Eugene OR, June 2015.

“Case-Based Learning” Workshop leader and poster discussion facilitator. American Physiological Society Institute on Teaching Learning. Bar Harbor ME, June 2014.

“Concept Inventories: Assessing Concepts and Competencies to Improve Learning and Teaching.” Co-chairperson and presenter. Teaching of Physiology Section Featured Topic Symposium. Annual Meeting of the American Physiological Society. Experimental Biology 2013, Boston MA, April 2013.

“Developing Case Studies.” Presenter and workshop leader. Summer Faculty Workshop. School of Naturopathic Medicine, Bastyr University, Kenmore WA, August 2012.

"A Backward Approach to Designing Case Studies." Workshop leader. Annual National Conference on Case Study Teaching in Science, University at Buffalo, Buffalo NY,

September 2011.

Scholarship of Teaching and Learning Institute. Faculty facilitator and presenter. Biology Scholars Program. Washington DC, July 2008, 2009, 2010, 2011.

“Helping Students Put the Pieces Together: Fostering Integrative Learning of Physiology.” Symposium organizer. “Mapping out the approaches to integrative learning of physiology.” Presenter. Teaching of Physiology Section Featured Topic Symposium. Annual Meeting of the American Physiological Society. Experimental Biology 2010, San Diego CA, April 2010.

“Case-Based Learning. What is Best Practice?” Presenter. Division of Gastroenterology, Hepatology, and Nutrition, University at Buffalo School of Medicine and Biomedical Sciences. Buffalo NY, September 2008.

“Is formative assessment an effective way to improve learning?” Presenter. Teaching of Physiology Section Symposium. Annual Meeting of the American Physiological Society. Experimental Biology 2008, April 2008.

“Why Case-Based Learning in Medical Education?” Presenter. Rush University School of Medicine. Chicago IL, December 2007.

"Making Understanding Visible: Using Concept Maps for Student Learning and Assessment". Presenter. Discovery Learning Center, University of Texas, Austin TX, October 2007.

New Faculty and Mentors Teaching Strategies Conference. Conference leader. College of Natural Sciences, University of Texas, Austin, October 2007.

“Case studies in practice.” Workshop leader. Lecturer’s Teaching Luncheon. School of Biological Sciences, University of Texas, Austin, December 2006.

“Implementing case-based pedagogies in the natural sciences.” Workshop leader. 2nd Annual Conference. International Society for the Scholarship of Teaching and Learning, Vancouver BC, October 2005a.

“Case-based pedagogies enhance understanding by engaging both cognitive and affective aspects of student learning.” Symposium speaker. 2nd Annual Conference. International Society for the Scholarship of Teaching and Learning, Vancouver BC, October 2005b.

"The Directed Case Method". Workshop leader. Annual National Conference on Case Study Teaching in Science, University at Buffalo, Buffalo NY, October 2001, 2002, 2003.

“Open-Ended and Closed-Ended Approaches to the Design of Case Studies” Workshop leader. Human Anatomy and Physiology Society Conference, Phoenix AZ, May 2002.

"Incorporating Case Studies in the Physiology Classroom." Symposium organizer and workshop leader. Teaching of Physiology Section Symposium. Annual Meeting of the American Physiological Society. Experimental Biology 2002, April 2002.

"Teaching High School Biology with Case Studies". Workshop leader. Western NY Advanced Placement Biology Network, Daemon College, Amherst NY, January 2002.

"Case Study Teaching in the Sciences". Workshop leader. Discovery Learning Center, University of Texas, Austin TX, November 2000.

"Teaching Biology with Case Studies" Speaker. Section of Neurobiology, School of Biological Sciences, University of Texas, Austin, November 2000.

"Case Study Method for Teaching Human Anatomy and Physiology" Speaker. College of Medicine, Umeå University, Umeå, Sweden, October 2000

"Powerful Pedagogies: Problem-Based Learning, Case Studies, and Simulations". Symposium presenter. Carnegie Academy for the Scholarship of Teaching and Learning Summer Institute, San Jose CA, June 2000.

"The Biomedical Importance of Chloride Channels" First Annual Faculty Research Symposium, Niagara University Board of Trustees Fall Meeting, 1997.

"Cystic Fibrosis: A Disease of Cl Channels" Biology 425 Cellular Neurobiology. Canisius College, Buffalo NY. February 1997.

"Directed Case Study Method for Teaching Human Anatomy and Physiology". Speaker and workshop leader. 10th Conference. Human Anatomy and Physiology Society, Portland, OR, June 1996.

"Case Studies in Science: Exploring our Practice." Advanced Workshop Presenter. University at Buffalo, Buffalo, June 1996.

"Cl Conductances in Secretory Epithelial Cells" Department of Physiology Seminar Series. School of Medicine and Biomedical Sciences. University at Buffalo, Buffalo NY. May 1994.

"Cystic Fibrosis: A Disease of Cl Channels" Cultural Life Committee Spring Lecture Series. Roberts Wesleyan College, Rochester NY. April 1994.

Invited Reviews

Ad hoc Manuscript Reviewer for:

Advances in Physiology Education, 2000-present.

National Center for Case Study Teaching in Science, 2005-present

American Journal of Physiology (Cell Physiology), 1988-1992

American Journal of Physiology (Gastrointestinal Physiology), 1995-1999

European Journal of Physiology, 1992-1994

International Archives of Allergy and Immunology, 1992

FASEB Journal, 1994-2000

Journal of Membrane Biology, 1998-2000

Journal of Comparative Biochemistry and Physiology, 1999-2004

Book Review

Bradbury, N. A Taste for Poison. Eleven Deadly Molecules and the Killers Who Used Them. St Martin's Press, 2022.

Grant Review

National Science Foundation. Course, Curriculum and Laboratory Improvement. Summers 2005, 2007, 2008. Washington, DC.

Educational Material

National Center for Case Studies in Science Case Collection, 2000-present.

Addison Wesley Longman. Comprehensive review of the Lab Partner CD-ROM to accompany Marieb, E. Human Anatomy and Physiology Laboratory Manual, 5th Edition (1998).

Saunders College Publishing. Comprehensive review of proposed multimedia, electronic textbook in human anatomy and physiology. (1997).

WCB/McGraw Hill. Comprehensive review of Saladin, K. Human Anatomy and Physiology: The Unity of Form and Function, (1997). Chapter 13.

McGraw-Hill, Inc. Comprehensive review of Van Wynsberghe, D. et al. Human Anatomy and Physiology, 3rd Edition (1995). 10 chapters.

Institutional Review

External evaluator of "Organ system structure and function" (Umeå University, Umeå, Sweden) May 2004.

Member of the Standard Setting Committee for Anatomy and Physiology. Excelsior College Examinations. March 2004.

Member of the External Review team for the Liberal Arts: Mathematics and Science Program (Niagara County Community College) 1997.

Extramural Funding

National Science Foundation. TUES Grant. "Defining and Assessing the Core Principles of Undergraduate Physiology." Co-principal investigator. 2011-2014.

National Science Foundation. TUES Grant. - "Validating A Pedagogy of Conceptual Learning: Applications in Internet Delivered Physiology Experiments." Collaborator. 2011-2013.

American Physiological Society. Teaching Career Enhancement Award. 2007-2008.

National Science Foundation. REC-9909411 "Active Learning as a Basis for Reform of Undergraduate Life Science Education." Co-investigator / subcontract. 2002.

Pew National Fellowship. Carnegie Academy for the Scholarship of Teaching and Learning. 2000-2001.

Cystic Fibrosis Foundation F230 "cAMP-activated Cl conductance in normal and CF epithelia", July 1991 - June 1993.

National Institutes of Health NRSA DK08260, "Adenosine regulation of Cl secretion in epithelia", June 1989 - July 1991.

Supervision of Student Research and Research Theses

Julianna Hawley. Internship/independent study with NYS Office of Parks, Recreation and Historic Preservation. (2009). Nature educator, Manice Education Center 2009-2010; MS, Environmental Sciences Program, Florida Atlantic University.

Amanda Benko. Departmental Honors research project "Regulation of potassium channels by calcium ions." (2005-2006)

Rebekah Hubbard. Departmental Honors research project "Regulation of potassium channels by bile acids." (2003-2004). Pharmacy student, University at Buffalo School of Pharmacy and Pharmaceutical Sciences.

Amanda Turnbull. Departmental Honors research project "Regulation of potassium channels in a human liver cell line." (2002-2003). Research Technician, Vertex Pharmaceuticals.

Heather Jones. Ph.D. from SUNY Buffalo School of Medicine and Biomedical Sciences, Department of Physiology. Member of her Ph.D. thesis committee. (1999-2002). Assistant Professor of Biology, Gannon University.

Monica Burgio. Departmental Honors research project "Effectiveness of case study analysis in teaching anatomy and physiology to high school students". (1998-1999). High school teacher and administrator.

Rathini Packianathan. Departmental Honors research project "Control of Ca-dependent Cl channels by G proteins". (1998-1999). Masters student at Roswell Park Cancer Institute (1999-2000). D.D.S., SUNY Buffalo.

Stacey McCulle. Ph.D. candidate at SUNY Buffalo School of Medicine and Biomedical Sciences, Department of Physiology. Member of her Ph.D. thesis committee. (1995- 1999).

William DiLorenzo. University Honors research project "The effect of pH on Ca-dependent Cl channels in secretory epithelial cells." (1997-1998). D.O., NYCOM.

Nalini Packianathan. Departmental Honors research project "Control of Ca-dependent Cl channels by G proteins". (1995-1996). Graduate student at Roswell Park Cancer Institute (1996-1997). M.D., SUNY Buffalo.

Lisa Romano. Ph.D. from SUNY Buffalo, Department of Biology. External reviewer of her Ph.D. thesis. 1994.

Jason Borton. Department Honors research project "Regulation of Cl Channels induced by cell swelling". (1994-1995). M.D., SUNY Buffalo.

Kathy Au. Independent study. Regulation of Cl and K channels by acetylcholine. (Summer 1994-1995). M.S. Biology Education, Niagara University.

Farah Ahmed. Independent study. Writing children's books on human health and disease. (Fall 1994-1995).

Maria Frosini. Independent student research project "Relation between pp60^{c-src} levels and differentiation in T84 cells" (Summer 1993-1994). Research technician at UB (1994-1996). R.N., Niagara University.

Karen Head. University Honors research project "Cellular protein phosphatases in the regulation of calcium-activated Cl channels". Awarded an Undergraduate Student Science Research Grant from the Rochester Academy of Sciences. (1993-1994). M.S. (Roswell Park Cancer Institute). Research scientist at Roswell Park Cancer Institute.

Professional Societies

American Physiological Society
Project Kaleidoscope
Council on Undergraduate Research
Sigma Xi, The Scientific Research Society
Mount Desert Island Biological Laboratory
American Association for the Advancement of Science
New York State Outdoor Education Association

Service to the Profession

Member of the Editorial Board – National Center for Case Study Teaching in Science. (2010-present)
Member of the Editorial Board - Advances in Physiology Education. American Physiological Society. (2001-2022).
 Guest Editor - Call for papers on physiology core concepts (2022-2023)
 Awarded “Star Reviewer” for 2007
Faculty Mentor. Physiology Education Community of Practice. American Physiological Society. (2014-2015).
Co-Chairperson - Teaching of Physiology Featured Topic Symposium. Annual Meeting of the American Physiological Society. (2013)
Member of the Nominating Committee. Section on Teaching of Physiology. American Physiological Society. (2012-2013)
Research Residency Steering Committee. Biology Scholars Program, Washington DC. (2008- 2011)
Nominating Committee for the Walter C. Randall Lecture on Biomedical Ethics, American Physiological Society. (2008-2011)
 Chair (2008-2010)
Organizer and Chair - Teaching of Physiology Featured Topic Symposium. Annual Meeting of the American Physiological Society. (2010)
Member of the Steering Committee. Section on Teaching of Physiology. American Physiological Society. (2003-2004)
Selection Committee for the Guyton Physiology Educator of the Year Award. American Physiological Society. (2002-2004)
 Chair (2003-2004)
Organizer and Chair - Teaching of Physiology Symposium. Annual Meeting of the American Physiological Society. (2002)
Coordinator. Experimental Biology Christian Fellowship. (2003-present).

Service to the University

Committee on College Teaching and Learning (2003-present)
 Chair (2004-2005), Co-Chair (2009-2011)
 Annual Conference Coordinator (2004, 2005)
Senate General Education Committee – Natural Science Work Group (2020-present)
College of Education TEAC Committee (2018-present)
Committee on Recommendations for Pre-Medical and Pre-Dental Students (1998-2023)
 Chair (2004-2023)
Vincentian Scholars Program (2022-2023)
Niagara’s Restart Implementation Task Force (2020-2022)
 Public Health Committee
College of Arts and Sciences Faculty Scholarship Award Committee (2018-2022)
 Chair (2019)
Sabbatical Leave Review Committee (2015-2017)
Committee on Innovation in Teaching Award (2013)

Health Advisory Workgroup (2012)
University Radiation Safety Committee (1994-present)
 Chair (2005-present)
Institutional Animal Care and Use Committee (2005-present)
Middle States Taskforce on Active, Integrated Learning (2005-2007)
 Chair (2005-2007)
Library Advisory Committee (2002-2008)
College of Arts and Sciences Curriculum Committee (2002-2006)
Student Employee of the Year Committee (2002)
University Information Literacy Committee (2001)
Niagara University Research Council (1999-2001)
 Council Chair (2000-2001)
 Area Committee Chair (2002, 2005)
Arts and Sciences Program Committee for Faculty Development (1998-2001)
 Chair
 Coordinator of workshop series on Scholarship, Service and Teaching.
Senator - Niagara University Academic Senate (1998-2000)
Senate Committee on Academic Standards, Planning and Support (1999-2000)
 Chair
Committee for Implementation of OSHA Guidelines (1993-1996)
 Chair - Subcommittee on Hazardous Waste (1994-1996)
University Search Committee for Dean of Nursing (1995-1996)
Senate Curriculum Committee (1994-1996)
Arts and Sciences Program Committee (1992-1995)

Service to the Biology Department

Honors Research Coordinator (1994-2006)
Biological Safety Officer (1993-2013)
Moderator – Niagara Student Biology Club (1998-2006)
Faculty Search Committee (1993, 1994, 1995, 2002, 2003, 2004, 2016, 2017)

Service to the Community

Member – Friends of Stella Niagara Preserve, Western New York Land Conservancy (2019-present)
Niagara Falls Health Equity Task Force (2021-2022)
 Member (Niagara University)
 Instructor and Coach - Public Health Youth Ambassadors Program (2021)
Volunteer – Invasive Species Removal, Western New York Land Conservancy (June 2019)
Volunteer – Paddles Up Niagara, Niagara Greenway Commission (July 2006, 2008, 2009, 2010, 2012, 2013, 2014, 2015, 2016, 2017)
Volunteer Naturalist – Beaver Island State Park Nature Center (July/August 2005, 2006, 2008, 2009, 2010, 2012, 2014, 2015, 2016)
Judge – Science Fair – Covenant Academy (April 2007)
Judge - Science Fair – Sacred Heart Villa School (January 2007)

Keynote Speaker – Grand Island PTSA Annual Academic Awards Ceremony (May 2006)

Naturalist – Summer Camp, High Braes Refuge, Redfield NY (July 2004)

Presenter – Career Day, Covenant Academy, Kenmore NY (2003)

Judge - Regional Science Fair - Houghton College (2000)

Judge – Canisius College Science Fair and Colloquium (1997)

Volunteer - EXCEL (academic enrichment program of the Grand Island Public Schools)
presentations on the human body to kindergarten, first and second grade classes.
(1994-1996)

Representative at Career Fair '96 - Charles Grandison Finney High School, Buffalo NY
(1996)