

ARMIN KARGOL

EDUCATION AND CAREER HISTORY

Department of Physics, Loyola University, New Orleans, LA 70118

- Assistant Professor (tenure-track) (2003-present)

Department of Physics and Astronomy, Tulane University, New Orleans, LA 70118

- Visiting Assistant Professor (2001-2003)
- Faculty Member of Neuroscience Graduate Program (2001-2003)
- Research Fellow/Adjunct Faculty (1999-2001)

Department of Physics, Eastern Mediterranean University, Famagusta, N. Cyprus

- Associate Professor (1999)
- Assistant Professor (1995-1998)

Institute for Mathematics and its Applications, University of Minnesota, Minneapolis, MN 55455, USA

- Postdoctoral Fellow in "Waves and Scattering" Program (1994-1995)

Virginia Polytechnic Institute and State University, Blacksburg, VA 24061, USA

- **Ph.D. in Physics** (awarded in July 1994)
Advisor: Prof. George A. Hagedorn
Ph.D. Dissertation: "The Born-Oppenheimer approximation in scattering theory"
- **MS in Mathematics** (awarded in December 1992)
Advisor: Prof. George A. Hagedorn

University of Wroclaw, Wroclaw, Poland

- **MS in Theoretical Physics** (awarded in June 1987) – with distinction
Advisor: Prof. dr hab. Witold Karwowski
MS Thesis: "Partial *-algebras and their applications"

PROFESSIONAL ACTIVITIES

• **Awards:**

1. Marquette Fellowship, Loyola University New Orleans, Summer 2005

• **Grants:**

1. EPSCoR Pfund grant "Control of voltage-gated ion channels with nonequilibrium voltage fluctuations", \$12,000, 06.2005-05.2006
2. LA BoR Enhancement grant "Interdisciplinary laboratory training: Introducing biophysics into physics laboratory courses", \$31,755, 06.2005-05.2006, Co-PI's: C. King, M. McHugh
3. Research Corporation Cottrell College Science Award "Novel voltage protocols and analysis methods for the non-equilibrium response spectroscopy of voltage-gated ion channels", \$40,718, 06.2005-05.2007

- **Membership:** American Physical Society, Biophysical Society, International Association of Mathematical Physics
- **Peer review:** Ad-hoc reviewer for Math. Reviews, NASA Gravitational Biology Program, Journal of Membrane Science, Physica A
- **Conference presentations and invited talks:**
 1. Midwest-Southeast Atlantic 2-nd Joint Regional Conference on Differential Equations, Lexington, KY, Nov. 13-15, 1992 (contributed talk)
 2. 13-th Meeting of the Southeast Atlantic Regional Conference on Differential Equations, Wilmington, NC, Oct. 15-16, 1993 (contributed talk)
 3. 22-nd Midwest Differential Equations Conference, Columbia, MO, Nov. 12-14, 1993 (contributed talk)
 4. The UAB - Georgia Tech International Conference on Differential Equations and Mathematical Physics, Birmingham, AL, March 13-17, 1994 (contributed talk)
 5. VI Polish Conference "Cell Biology", Lublin, Poland, 12-14 Sept. 1996 (co-author of a contributed talk)
 6. Mathematical Results in Quantum Mechanics (Qmath7), Prague, Czech Republic, 22-26 June 1998 (contributed talk)
 7. IV National Conference "Applications of mathematics in biology and medicine", Zwierzyniec, Poland, 15-18 Sept. 1998 (co-author of contributed talk)
 8. Biophysical Society meeting, New Orleans, LA, Feb. 12-16, 2000 (co-author of a poster)
 9. Biophysical Society meeting, Boston, MA, Feb. 17-21, 2001 (co-author of a poster)
 10. Conference "Agrophysics in the beginning of XXI century", Lublin, Poland, May 14-15, 2001 (co-author of a contributed talk)
 11. Tulane University, New Orleans, LA, Feb 2002 (seminar lecture)
 12. University of Wisconsin – Milwaukee, Milwaukee, WI, Feb. 6, 2003(seminar lecture)
 13. New Orleans Protein Folding Intergroup – New Orleans, Jan. 15, 2004 (seminar lecture)
 14. XII Conf. of Polish Biophysical Soc., Wroclaw, Poland, Sept. 15-17, 2004 (co-author of 3 contributed talks)
 15. International Symposium on Interdisciplinary Science, Natchitoches, LA, Oct. 6-8, 2004 (invited lecture)
 16. Loyola University, Chemistry Department – New Orleans, Nov. 8, 2004 (seminar lecture)

PUBLICATIONS

Papers in peer-reviewed journals:

1. **Armin Kargol:** The infinite time limit for the time-dependent Born-Oppenheimer approximation, Commun. Math. Phys. 166 (1994) 129-148
2. Marian Kargol, Tadeusz Kosztolowicz, **Armin Kargol:** Gravidiffusion in the liquid state. An attempt at a mathematical description, Current Topics Biophys. 19(2) (1995) 58-65
3. Marian Kargol, Tadeusz Kosztolowicz, **Armin Kargol**, Stanislaw Przystalski: Kedem-Katchalsky equations for gravi-diffusion, Current Topics Biophys. 19(2) (1995) 50-57
4. **Armin Kargol**, Marian Kargol: The plant root as an osmo-diffusive converter of free energy, Gen. Physiol. Biophys. 15 (1996) 17-26

5. Marian Kargol, **Armin Kargol**: A synthetic approach to biophysical theories of water translocation in plants occurring over long distances, *Current Topics Biophys.* 20 (1996) 149-153
6. **Armin Kargol**: An integrated approach to water transport in a plant over long distances, *J. Biol. Phys.* 22 (1996) 157-173
7. **Armin Kargol**, Adam Markowski: Energetic efficiency of osmotic water transport across a root, *Acta Physiol. Plant.* 18 No.4 (1996) 351-358
8. Marian Kargol, **Armin Kargol**, Stanislaw Przystalski: Kedem-Katchalsky equations adapted for describing substance transport across biological membranes, *Cell. Mol. Biol. Lett.* 2 (1997) 117-124
9. **Armin Kargol**: A description of reverse osmosis using practical Kedem-Katchalsky equations, *J. Biol. Phys.* 23 (1997) 111-120
10. **Armin Kargol**: Hyperfiltration described using the Kedem-Katchalsky formalism, *Polish J. Med. Phys. Eng.* 3 No.1 (1997) 33-41
11. **Armin Kargol**, Marian Kargol, Stanislaw Przystalski: Correlation relation between the membrane transport parameters L_p , σ , and ω , *J. Biol. Phys.* 23 (1997) 233-238
12. Marian Kargol, Tadeusz Kosztolowicz, **Armin Kargol**, Stanislaw Przystalski: A study of concentration profiles in near-membrane unstirred layers, *Polish J. Med. Phys. and Eng.* 4 (2) (1998) 69-85
13. Marian Kargol, Grazyna Suchanek, Stanislaw Przystalski, **Armin Kargol**: Mathematical analysis of the modified Muench model (Analiza matematyczna zmodyfikowanego modelu Muencha), *Current Topics Biophys.* 22 (1998) 31-33
14. **Armin Kargol**: The Born-Oppenheimer approximation to the wave operators, *Commun. Theoret. Phys.* 31 (1999) 397-402
15. **Armin Kargol**: Semiclassical scattering by the Coulomb potential, *Ann. Inst. H. Poincare, Theoret. Phys.* 71 (1999) 339-357
16. **Armin Kargol**: Effect of boundary layers on reverse osmosis through a horizontal membrane, *J. Membr. Sci.* 159 (1999) 177-184
17. Marian Kargol, **Armin Kargol**: Graviosmotic effects, *Current Topics Biophys.* 24(1) (2000) 65-77
18. **Armin Kargol**: Modified Kedem-Katchalsky equations and their applications, *J. Membr. Sci.* 174 (2000) 43-53
19. Marian Kargol, **Armin Kargol**: Membrane transport generated by the osmotic and hydrostatic pressure. Correlation for the parameters L_p , σ , and ω . *J. Biol. Phys.* 26 (2000) 307-320
20. Marian Kargol, Grazyna Suchanek, **Armin Kargol**: Modification and quantitative analysis of the Muench model in the integrated system of water translocation in plants. *Gen. Physiol. Biophys.* 20 (2001) 191-202
21. Marian Kargol, **Armin Kargol**, Stanislaw Przystalski: Studies on the structural properties of porous membranes: measurement of linear dimensions of solutes. *Biophys. Chem.* 91 (2001) 263-271
22. **Armin Kargol**: A mechanistic model of transport processes in porous membranes generated by osmotic and hydrostatic pressure. *J. Membr. Sci.* 191 (2001) 61-69
23. **Armin Kargol**, Bryan Smith, Mark M. Millonas: Application of nonequilibrium response spectroscopy to the study of channel gating. Experimental design and optimization. *J. Theoret. Biol.* 218 (2002) 239-258
24. Azida Hosein-Sooklall, **Armin Kargol**: Wavelet analysis of nonequilibrium ionic currents in human heart sodium channel (hH1a). *J. Membr. Biol.* 188 (2002) 199-212

25. **Armin Kargol**, Marian Kargol: A reply to remarks on the mechanistic model of transport processes in porous membranes. *J. Membr. Sci.* 214 (2003) 335-338
26. Marian Kargol, **Armin Kargol**: Mechanistic equations for membrane substance transport and their identity with Kedem-Katchalsky equations. *Biophys. Chem.* 103 (2003) 117-127
27. Marian Kargol, **Armin Kargol**: Mechanistic formalism for membrane transport generated by osmotic and mechanical pressure. *Gen. Physiol. Biophys.* 22 (2003) 51-68
28. Marian Kargol, Grażyna Suchanek, Maciej Przystalski, **Armin Kargol**: Modification of integrated system of long-distance transport of water in plants. Where the plant has its heart? *Current Topics Biophys.* 27 (2003) 3-9
29. **Armin Kargol**, Azida Hosein-Sooklal, Lucian Constantin, Maciej Przystalski: Application of oscillating potentials to Shaker potassium channel. *Gen. Physiol. Biophys.* 23 (2004) 53-75
30. **Armin Kargol**: Application of the ensemble nonequilibrium response spectroscopy to Shaker potassium ion channel gating. *Cell. Mol. Biol. Lett.* 9(2) (2004) 375-388
31. **Armin Kargol**, Azida Hosein-Sooklal: Optimal sensitivity analysis of ion channel gating kinetics. *J. Membrane Biol.* 199 (2004) 113-118
32. Marian Kargol, **Armin Kargol**: Biophysical mechanisms of physiological water exchange with the surroundings by the cells of the *Nitella Translucens* and *Chara Corallina* plants. *Acta Physiol. Plant.* 27 (2005) 71-79
33. Marian Kargol, Grażyna Suchanek, Maciej Przystalski, J. Siedlecki, **Armin Kargol**: Problem of water exchange across the living cell in the light of the mechanistic equations of transport. *Polish J. Environment. Studies* 14 (2005) 65-71
34. Marian Kargol, Grażyna Suchanek, Maciej Przystalski, **Armin Kargol**: Investigations into biophysical regulation mechanisms of physiological water exchange of the *Nitella translucens* cells with the surroundings. *Acta Physiol. Plant.* (in press)
35. **Armin Kargol**, Maciej Przystalski, Marian Kargol: A study of porous structure of cellular membranes in human erythrocytes. *Cryobiology* 50 (2005) 332-337

Conference Proceedings:

36. Marian Kargol, **Armin Kargol**: Some critical remarks on physics education in technical universities, Proc. XI Conf. on Physics Education in Technical Universities, Warsaw, Poland, 27-28 June 1996, 44-46
37. Marian Kargol, **Armin Kargol**, Stanislaw Przystalski: Kedem-Katchalsky equations as applied for describing substance transport across biological membranes, Proceedings VI Polish Conference "Cell Biology", Lublin, 12-14 Sept. 1996, *Folia Histochem. et Cytobiol.* 34(2) (1996) 12
38. Marian Kargol, **Armin Kargol**, Adam Markowski, Stanislaw Przystalski: A procedure for separation of membrane transport into passive and active components, Proc. IV National Conf. "Applications of mathematics in biology and medicine", Zwierzyniec, Poland, Sept. 15-18, 1998, 53-63
39. **Armin Kargol**, Mark M. Millonas: Optimal waveform analysis of voltage sensitive ion channel gating kinetics (abstract). *Biophys. J.* 78 (2000) 219a
40. **Armin Kargol**, Bryan Smith, Mark M. Millonas: Applications of nonequilibrium response spectroscopy to the study of channel gating (abstract). *Biophys. J.* 80 (2001) 442a
41. Marian Kargol, Grażyna Suchanek, **Armin Kargol**, Maciej Dobkiewicz, Stanislaw Przystalski: Pobieranie wody glebowej i jej długodystansowa translokacja w roślinie (Soil water uptake and its long-distance transport in plants). (abstract) Proc. Conf. "Agrophysics in the beginning of XXI century", Lublin, May 14-15, 2001, 77-78

42. Grażyna Suchanek, Maciej Przystalski, Marian Kargol, **Armin Kargol**: Mechanistic equations of membrane transport of multicomponent solutions (abstract). Current Topics Biophys. 28 (2004) Proc. XII Conf. of Polish Biophys. Soc., Wrocław, Poland, Sept. 15-17, 2004
43. Grażyna Suchanek, Maciej Przystalski, Marian Kargol, **Armin Kargol**: Water transport route from the soil to the root xylem according to the mechanistic approach (abstract). Current Topics Biophys. 28 (2004) Proc. XII Conf. of Polish Biophys. Soc., Wrocław, Poland, Sept. 15-17, 2004
44. Grażyna Suchanek, Maciej Przystalski, Marian Kargol, **Armin Kargol**: Mechanistic interpretation of transport parameters of root endodermis (abstract). Current Topics Biophys. 28 (2004) Proc. XII Conf. of Polish Biophys. Soc., Wrocław, Poland, Sept. 15-17, 2004
45. Marian Kargol, **Armin Kargol**, Grażyna Suchanek, Maciej Przystalski, Maciej Dobkowicz, Jolanta Dobkowicz: The influence of some parameters of water medium on stationary water exchange by plants living therein, Monographs of Environmental Engineering Committee of Polish Academy of Sciences (PAN) 22 (2004) 369-377 Proc. of V Conf. "Membranes and Membrane Processes in Environmental Protection"
46. **Armin Kargol**: Non-equilibrium studies of voltage-gated ion channels. Proc. Intl. Conf. on Interdisciplinary Science (ISIS), Natchitoches, LA, Oct. 2004, eds. A.Ludu, N.R.Hutchins, D.R.Fry, AIP 2005, p. 159-164