

3) **Publications, h-index=i10-index=9, total citations 219 (Google Scholar).**

a) **Articles in peer-reviewed scientific journals**

- [1] A. Sopasakis, Lattice Free Stochastic Dynamics, *Communications in Computational Physics*, to appear, Sept. 2012.
- [2] M.A. Katsoulakis, A.J.Majda and A. Sopasakis, Hybrid deterministic stochastic systems with microscopic look-ahead dynamics, *Commun. Math. Sci.*, Vol. 8, No 2, 409-437, 2010.
- [3] T. Alperovich and A.Sopasakis, Stochastic description of traffic flow, *J.Stat.Phys*, 133: 1083-1105, 2008. Timur Alperovich was my student at the Univ. of Massachusetts.
- [4] M.Asadzadeh and A.Sopasakis, Convergence of hp-finite element schemes for Vlassov–Poisson–Fokker–Planck system, *Mathematical Models and Methods in Applied Sciences*, 08(17), 1159-1182, 2007.
- [5] M.A. Katsoulakis, A.J.Majda and A. Sopasakis, Prototype hybrid couplings of macroscopic deterministic models and microscopic stochastic lattice dynamics, *AMS Contemporary Mathematics*, (429), pp.143-187, 2007.
- [6] M.A.Katsoulakis, P.Plechac and A. Sopasakis, Error analysis of coarse-graining for stochastic lattice dynamics, *SIAM J. on Numerical Analysis*, 44, pp. 2270-2296, 2006.
- [7] M. A. Katsoulakis, A. J. Majda and A. Sopasakis, Intermittency, metastability and coarse graining for coupled deterministic-stochastic lattice systems, *Nonlinearity*, 19, pp. 1-27, 2006.
- *Among top-downloaded articles for Nonlinearity and listed in their “High-Profile Articles” for 2006.**
- [8] M.Asadzadeh and A.Sopasakis, A Nodal Method for Absorption - Diffusion Problems, *Applied and Computational Mathematics*, 5, No 1, pp. 45-58, 2006.
- [9] A.Sopasakis and M.A.Katsoulakis, Stochastic modeling and simulation of traffic flow: ASEP with Arrhenius look-ahead dynamics, *SIAM J. on Applied Mathematics*, 66, No. 3, pp. 921-944, 2006.
- [10] M.A. Katsoulakis, A.J. Majda and A. Sopasakis, Multiscale couplings in prototype hybrid deterministic/stochastic systems: Part II, stochastic closures, *Communications in Mathematical Sciences*, 3, No. 3, pp. 453-478, 2005.
- [11] A.Sopasakis, Stochastic noise approach to traffic flow modeling, *Physica A*, 342, No 3-4, pp. 741-754, 2004.
- [12] M.A.Katsoulakis, A.J.Majda and A. Sopasakis, Multiscale couplings in prototype hybrid deterministic/stochastic systems: Part I, deterministic closures, *Communications in Mathematical Sciences*, No 2, pp. 255-294, 2004.
- [13] A.Sopasakis, Formal asymptotic models of vehicular traffic. Model closures, *SIAM Journal on Applied Mathematics*, 63, No. 5, pp. 1561–1584, 2003.
(Based on a portion of dissertation.)
- [14] A.Sopasakis, Unstable flow theory and modeling, *Mathematical and Computer Modelling* 35, pp. 623-641, 2002. (Based on a portion of dissertation)
- [15] M.Asadzadeh and A.Sopasakis, On Fully Discrete Schemes for the Fermi Pencil-Beam Equation, *Computer Methods in Applied Mechanics and Engineering*, 191, pp. 4641-4659, 2002.
- [16] P.Nelson and A.Sopasakis, The Prigogine-Herman kinetic model predicts widely scattered traffic flow data at high concentrations, *Transportation Research B*, 32 8, pp. 589-604, 1998. (Transportation Res. B is widely considered a leading journal in the area of the theory of vehicular traffic flow)

b) Articles in peer-reviewed scientific meetings (note: stricter than journal peer-reviewing)

[17] N.Dundon and A.Sopasakis, Stochastic modeling and simulation of multi-lane traffic, *Transportation and Traffic Theory*, Eds. Allsop, Bell and Heydecker, London, Elsevier, pp. 661-689, 2007. Miss Dundon was my graduate student from the Univ. of Massachusetts.

[18] P.Nelson and A.Sopasakis, The Chapman-Enskog Expansion: A Novel Approach To Hierarchical Extension Of Lighthill -Whitham Models in *Transportation and Traffic Theory: Proceedings of the 14th International Symposium*, A. Ceder, (ed.), Pergamon, pp. 51-79, 1999.

[19] P.Nelson, D.D.Bui and A.Sopasakis, The Generalized Bimodal Traffic Stream Model and Two Regime Flow Theory, in *Transportation and Traffic Theory: Proceedings of the 13th International Symposium*, J.B. Lesort, (ed.), Pergamon, pp. 679-696, 1996.

(All three of the above underwent extensive peer reviewing since the *Transp. And Traffic Theory* meeting is considered to be the premier traffic meeting in the world).

[20] P.Nelson, D.D.Bui and A.Sopasakis, A Novel Traffic Stream Model Deriving from a Bimodal Kinetic Equilibrium, 8th IFAC (International Federation of Automatic Control) Symposium on Transportation Systems, M. Papageorgiou and A. Pouliezios, (eds.), Crete, Greece, 1997, pp. 799-804.

c) Conferences without peer review None.

d) Books and book chapters

Chapter in Volume “Highways, construction, management and maintance”, Editor F. Columbus by A. Sopasakis, Stochastic Modeling of Traffic Flow, Novascience, accepted.

e) Technical reports/Preprints

[1] Error control and analysis in coarse-graining of stochastic lattice dynamics, with M. A. Katsoulakis and P. Plechac, arXiv.org: math/0509228, 2005.

[2] Convergence of hp-finite element schemes for Vlasov–Poisson–Fokker–Planck system, with M. Asadzadeh. Preprint 2003:50, Department of Mathematics, Chalmers, Goteborg.

[3] On Fully Discrete Schemes for the Fermi Pencil-Beam Equation, with M. Asadzadeh. Preprint 2000:48, Department of Mathematics, Chalmers, Goteborg.

[4] Accounting for boundary layer effects in the modelling of leaching from monolithic waste forms, with G. D. Allen and W. W. Pitt, Texas-Mexico II Workshop on numerical particle transport, College Station, Sept. 1992.

Ten Important Publications:

11 introduced a new approach in traffic theory and also led to a prestigious National Science Foundation research grant.

Also note wider scientific importance of #7

5	M.A. Katsoulakis, A.J.Majda and A. Sopasakis, 2007, Prototype hybrid couplings of macroscopic deterministic models and microscopic stochastic lattice dynamics, <i>AMS Contemporary Mathematics</i> , (429), pp.143-187. *This is an invited review elucidating mathematical analysis and generalization of techniques from pubs #6 & #7 below. I contributed with analysis, modeling and computation for this paper.
6	M.A.Katsoulakis, P.Plechac and A. Sopasakis, 2006, Error analysis of coarse-graining for stochastic lattice dynamics, <i>SIAM J. on Numerical Analysis</i> , 44, pp. 2270-2296. *We analyze the error of a new coarse-graining stochastic closure against the original microscopic lattice system and observe huge improvements in time while having a way of controlling (and knowing) the error we

	<p>are committing. I contributed with the computational and modeling aspects in this work.</p>
7	<p>M. A. Katsoulakis, A. J. Majda and A. Sopasakis, Intermittency, metastability and coarse graining for coupled deterministic-stochastic lattice systems, <i>Nonlinearity</i>, 19, 2006, 1-27. *Among top-downloaded articles for Nonlinearity and listed in their 'High-Profile Articles' for 2006. We examine and analyze a coupled multi-scale deterministic/stochastic system. We present a new coarse-graining stochastic closure for that system which is valid even in extreme cases of phase transitions, metastability and intermittent effects. I contributed in all aspects (analysis, modeling and computation) of this paper.</p>
9	<p>A. Sopasakis and M. A. Katsoulakis, Stochastic modeling and simulation of traffic flow: ASEP with Arrhenius look-ahead dynamics, <i>SIAM J. on Applied Math.</i>, 66, No. 3, 2006, pp. 921-944. *We derive macroscopic PDE traffic models starting from microscopic stochastic dynamics. This is the first microscopic model in existence which links to classical macroscopic well-known PDEs in the field. I contributed to modeling, analysis and computation in this work.</p>
10	<p>M.A. Katsoulakis, A.J. Majda and A. Sopasakis, 2005, Multiscale couplings in prototype hybrid deterministic/stochastic systems: Part II, stochastic closures, <i>Communications in Mathematical Sciences</i>, 3, No. 3, pp. 453-478. *We introduce a new coarse-graining stochastic closure for a hybrid deterministic/stochastic system. The benefit is that we retain the stochastic behavior of the original system as opposed to any deterministic type closure (see pub #6 above). I contributed with analysis, modeling and computational aspects of this work.</p>
11	<p>A.Sopasakis, Stochastic noise approach to traffic flow modeling, <i>Physica A</i>, 342, No 3-4, 2004, pp. 741-754. *We introduce a new approach in traffic modeling. Vehicles interact with each other and their surroundings using a novel fully stochastic interaction potential. This is a seminal paper with new and fundamental ideas for the field of traffic.</p>
12	<p>M.A.Katsoulakis, A.J.Majda and A. Sopasakis, 2004, Multiscale couplings in prototype hybrid deterministic/stochastic systems: Part I, deterministic closures, <i>Communications in Mathematical Sciences</i>, No 2, pp. 255-294. *We introduce and analyze both stochastic averaging and mean field type closures for a hybrid, deterministic/stochastic system coupled over different time/space scales. I contributed with the analysis, modeling and computational aspects in this work.</p>
13	<p>A. Sopasakis, Formal asymptotic models of vehicular traffic. Model closures, <i>SIAM J. on Applied Math.</i>, 63, No. 5, 2003, pp. 1561–1584. *Hilbert and Chapman Enskog expansion produce macroscopic PDEs which at 0th, 1st and 2nd order correspond to equivalent Euler, Navier-Stokes and Burgers equations respectively. This was part of my PhD dissertation.</p>
14	<p>A.Sopasakis, Unstable flow theory and modeling, <i>Mathematical and Computer Modelling</i> 35, 2002, pp. 623-641. *Stability analysis produces a non-linear PDE model valid for the high concentration chaotic regime of traffic flow. Part of my PhD dissertation.</p>
17	<p>Niamph Dundon and Alexandros Sopasakis, 2007, pp. 661-689, <i>Transportation and Traffic Theory</i>, Eds. Allsop, Bell and Heydecker, London, Elsevier. *We expand on the original idea in pub. #3 above by introducing a multi-lane model for traffic flow. In this paper we show that it is actually possible to model realistic highways. I introduced and supervised my graduate student to traffic modeling.</p>

All ten manuscripts are attached as individual PDF files at the end of this application according to instructions.