

# CURRICULUM VITAE

## Antoine Mellet

### 1. Personal Information

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### Education Background

- Undergraduate Institution: **École Normale Supérieure de Lyon** (1996-1999)
- Graduate Institution: **Université Paul Sabatier**, Toulouse, France (1999-2003)
- Postdoctoral Institution: **University of Texas at Austin** (2003-2006)

### Degrees

- **Magistère de Mathématiques**, École Normale Supérieure de Lyon (1999).
- **Agrégation de Mathématiques** (1999).
- **Ph.D.** (Mathematics), Université Toulouse III, December 2002.  
Thesis Advisor: **Pierre Degond**  
Postdoctoral Advisor: **L. A. Caffarelli**

### Appointments

- July 2011 - now: **Associate Professor** (Tenure) at the *University of Maryland, College Park*
- July 2008 - June 2011: **Assistant Professor** (Tenure-Track) at the *University of Maryland, College Park*
- July. 2006 - June 2008: **Assistant Professor** (Tenure-Track) at the *University of British Columbia*
- Sept. 2003 - July 2006: **Postdoctoral fellow** at the *University of Texas at Austin*
- Sept. 2000 - Aug. 2003: **Teaching Assistant** at the *Université Toulouse III*

## 2. Research, Scholarly and creative activities

### (a) Articles in Refereed Journals

- (1) T. Goudon, A. Mellet, *Diffusion approximation in heterogeneous media*, Asymptotic Analysis, **28** (2001), 331-358.
- (2) P. Degond, V. Latocha, S. Mancini, A. Mellet, *Diffusion dynamics of an electron gas between two plates*, Meth. Appl. of Analysis, **9** (2002), 127-150.
- (3) A. Mellet, *Diffusion limit of a nonlinear kinetic model without the detailed balance principle*, Monatshefte für Mathematik, **134** (2002), 305-329.
- (4) A. Mellet, B. Perthame,  *$L^1$  contraction property for a Boltzmann equation with Pauli statistic*, C. R. Acad. Sci. Paris, Ser. I, **335** (2002), 337-340.
- (5) T. Goudon, A. Mellet, *Discrete version of the SHE asymptotic: Multigroup neutron transport equations*, Journal Math. Physics, **43** (2002), 3232-3260.
- (6) N. Ben Abdallah, P. Degond, A. Mellet, F. Poupaud, *Electron transport in semiconductor superlattices*, Quarterly Appl. Math., **61** (2003), no. 1, 161-192.
- (7) T. Goudon, A. Mellet, *On fluid limit for the semiconductors Boltzmann equation*, Journal Diff. Equations, **189** (2003), 17-45.
- (8) A. Mellet, *Macroscopic model for coupled surface and volume collisions in semiconductor superlattices*, Asymptotic Analysis **33** (2003), 337-361.
- (9) T. Goudon, A. Mellet, *Homogenization and diffusion asymptotics of the linear Boltzmann equation*, Control, Optimisation and Calculus of Variations, **9** (2003), 371-398.
- (10) A. Mellet, S. Mischler, *Uniqueness and semigroup for the Vlasov equation with elastic-diffusive reflexion boundary conditions*, Applied Math. Lett., **17** (2004), no. 7, 827-832.
- (11) L.A. Caffarelli, K.-A. Lee, A. Mellet *Singular limit and Homogenization for flame propagation in periodic excitable media*, Arch. Rat. Mech. Ana., **172** (2004), 153-190.
- (12) J.P. Bourgade, A. Mellet, L. Mieussens, *Numerical comparison between two Spherical Harmonics Expansion models and a kinetic equation*, Math. Comput. Modeling, **40** (2004), no. 7-8, 777-795.
- (13) L. A. Caffarelli, K.-A. Lee, A. Mellet, *Homogenization and flame propagation in periodic excitable media: The asymptotic speed of propagation*, Comm. Pure and Applied Math, **59** (2006), 501-525.
- (14) L.A. Caffarelli, A. Mellet, *Capillary drops on an inhomogeneous surface*, Perspectives in Nonlinear P.D.E.: In honor of Haim Brezis. Contemporary Mathematics 175-201, Contemp. Math., **446**, Amer. Math. Soc., Providence, RI, 2007.

- (15) A. Mellet, A. Vasseur, *Homogenization of a nonlinear transport equation*, Asymptotic Analysis, **51**, (2007), 157-166.
- (16) A. Mellet, A. Vasseur, *On the barotropic compressible Navier-Stokes equation*, Comm. in P.D.E., **32**, (2007) 431-452.
- (17) L.A. Caffarelli, A. Mellet, *Capillary drops: Contact angle hysteresis*, Calc. Var. Partial Differential Equations **29** (2007), no. 2, 141-160.
- (18) L.A. Caffarelli, K.-A. Lee, A. Mellet, *Flame propagation in one-dimensional stationary ergodic media*, Math. Models Methods Appl. Sci., **17** (2007), 155-169.
- (19) A. Mellet, A. Vasseur. *Global weak solutions for a Vlasov-Fokker-Planck / Navier-Stokes system of equations*, Math. Models Methods Appl. Sci. **17** (2007), no. 7, 1039-1063.
- (20) A. Mellet, A. Vasseur, *Existence and uniqueness of global strong solutions for one-dimensional compressible Navier-Stokes equations*, SIAM Journal on Mathematical Analysis, **39** (2007/08), no. 4, 1344-1365.
- (21) A. Mellet, A. Vasseur, *Asymptotic analysis for a Vlasov-Fokker-Planck/Compressible Navier-Stokes system of equations*, Comm. Math. Phys. **281** (2008), no. 3, 573-596.
- (22) L.A. Caffarelli, A. Mellet, *Random Homogenization of Fractional Obstacle Problems*, Netw. Heterog. Media **3** (2008), no. 3, 523-554.
- (23) L.A. Caffarelli, A. Mellet, *Random Homogenization of an Obstacle Problem*, Ann. Inst. H. Poincaré Anal. Non Linéaire **26** (2009), no. 2, 375-395.
- (24) A. Mellet, A. Vasseur, *A bound from below for the temperature in compressible Navier-Stokes equations*, Monatsh. Math. **157** (2009), no. 2, 143-161.
- (25) I.C. Kim, A. Mellet, *Homogenization of a Hele-Shaw problem in periodic and random media*, Arch. Ration. Mech. Anal. **194** (2009), no. 2, 507-530.
- (26) A. Mellet, A. Vasseur,  *$L^p$  estimates for quantities advected by a compressible flow, submitted*, J. Math. Anal. Appl. **355** (2009), no. 2, 548-563.
- (27) A. Mellet, J. Nolen, J.-M. Roquejoffre and L. Ryzhik, *Stability of Generalized Transition Fronts*, Comm. Partial Differential Equations **34** (2009), no. 4-6, 521-552.
- (28) A. Mellet, J.-M. Roquejoffre, Y. Sire, *Generalized fronts for one-dimensional reaction-diffusion equations*, Discrete Contin. Dyn. Syst. **26** (2010), no. 1, 303-312.
- (29) I.C. Kim, A. Mellet, *Homogenization of one-phase Stefan-type problems in periodic and random media*, Trans. Amer. Math. Soc. **362** (2010),

4161-4190.

- (30) A. Mellet, *Fractional diffusion limit for collisional kinetic equations: A moments method*, Indiana Univ. Math. J., accepted.
- (31) A. Mellet *Some mathematical aspects of capillary surfaces*, Panoramas et synthèses, accepted.
- (32) A. Mellet, C. Mouhot, S. Mischler, *Fractional diffusion limit for collisional kinetic equations*, Arch. Ration. Mech. Anal. **199** (2011), 493-525.
- (33) A. Mellet, J. Vovelle, *Existence and regularity of extremal solutions for a mean-curvature equation*, Journal of Differential Equations, J. Differential Equations **249** (2010), 37-75.
- (34) N. Ben Abdallah, A. Mellet, M. Puel, *Anomalous diffusion limit for kinetic equations with degenerate collision frequency*, Math. Models Methods Appl. Sci., accepted.

(b) **Talks, Abstracts and other Professional Papers Presented**

*Workshop on Probabilistic Methods in Kinetic Theory, CIRM, Luminy.* July 2011

*South California PDE conference, San Diego.* May 2011

*Department of Mathematics, Columbia University, New York.* May 2011

*Workshop "Free Boundary Problems, Theory and Applications", MSRI.* March 2011

*University of Texas at Austin.* October 2010

*University of Minnesota.* October 2010

*Department of Mathematics, US Naval Academy.* April 2010

*Courant Institute of Mathematical Sciences, NYU,* April 2010

*SIAM Conference on Analysis of Partial Differential Equations.* Miami, December 2009

*Department of Mathematics, Duke University.* November 2009

*Department of Mathematics, George Washington University.* November 2009

*Third International Workshop on Variational Analysis and Applications.* Erice (Sicily), May 2009

*Workshop in PDE and Potential theory, KTH University.* Stockholm, June 2009

*Institute for Advanced Study.* Princeton, January 2009

*Department of Mathematics, University of Chicago.* November 2008

*Department of Mathematics, Georgetown University.* November 2008  
*Conference "Free boundary problem, theory and application",* Stockholm. June 2008  
*Special semester "Singularities and interfaces",* Lectures series on Interfaces and hydrodynamic instabilities: Capillary drops and contact angle problems, Institut Henri Poincaré. February 2008  
*Prairie Analysis Seminar,* Manhattan, Kansas. November 2007  
*Conference on "evolution of interfaces and applications",* Roscoff. May 2007  
*Department of Mathematics, University of Maryland.* February 2007  
*Department of Mathematics, UCLA.* November 2006  
*SIAM Conference on Analysis of Partial Differential Equations,* Boston. July 2006  
*Conference on "Nonlinear PDEs: Homogenization and Kinetic Equations",* Vienna. June 2006  
*Workshop on "Reaction-diffusion and Free Boundary Problems",* Banff. March 2006  
*Department of Mathematics, Carnegie Mellon University.* February 2006  
*Department of Mathematics, University of Illinois at Urbana-Champaign.* February 2006.  
*Department of Mathematics, Université Paris VI.* January 2006  
*Department of Mathematics, École Normale Supérieure, Paris.* January 2006  
*"Conference on Random Homogenization",* CIRM Marseille, France. July 2005  
*"2005 UAB international conference on differential equations and mathematical physics",* Birmingham, Alabama. April 2005  
*Department of Mathematics, École Polytechnique, France.* March 2005  
*Department of Mathematics, University of Texas.* February 2005  
*Department of Mathematics, École Normale Supérieure Ker Lann, Rennes.* April 2004  
*Department of Mathematics, Université Paris Sud, France.* May 2004  
*Department of Mathematics, University of Chicago.* February 2004  
*Department of Mathematics, Université Paul Sabatier, Toulouse.* April 2003  
*"GdR EAPQ",* Bordeaux. February 2003  
*Department of Mathematics, Université de Nice, Nice.* July 2002  
*Department of Mathematics, Université de Provence, Marseille.* June 2002  
*Department of Mathematics, Université de Bordeaux, France.* May 2002  
*Department of Mathematics, École Normale Supérieure, Paris.* April 2002  
*"Workshop on gyro-kinetic model",* Nancy, France. September 2000

*Workshop on "non-conventional" applications of kinetic theory*, Gothenburg, Sweden. June 2000

(c) **Contracts and Grants**

- i. **N.S.F. Individual Research Grant** DMS-0901340, "Non-Linear Partial Differential Equations, Free Boundary Problems and Fractional Operators" July 2009-August 2012. Principal investigator.
- ii. **NSF conference grant** DMS-0901718, "Thematic Program and Summer School in Partial Differential Equations and Applications" June 2009-July 2010. Principal investigator.
- iii. **N.S.E.R.C. Discovery Grant**. April 2007-April 2012. Principal investigator.
- iv. **N.S.F. Individual Research Grant**, DMS-0456647 , "On the Homogenization of Free Boundary Problems" June 2005-May 2008. Principal investigator.

(d) **Fellowships, Prizes and Awards**

- i. University of Texas R. H. Bing Fellowship, Sept. 2003-Aug. 2006.

(e) **Editorship, Editorial boards and Reviewing Activities for Journals**

Reviewer for the following journals:

Communication in Partial Differential Equations, Mathematical Models and Methods in Applied Sciences (M3AS), Journal of Mathematical Analysis and Applications, Duke Mathematical Journal , Discrete and Continuous Dynamical Systems, Calculus of Variation & PDE, SIAM Journal on Mathematical Analysis (SIMA), Annales de l'Institut Henri Poincaré, Advances in Mathematics, Journal of Differential Equations, Applied Mathematics Letters, Interfaces and Free Boundaries.

### 3. Teaching, Mentoring and Advising

(a) **Courses taught in the last five years**

University of Maryland

- Spring 2010: *Calculus III* (Math 241) - 200 students
- Fall 2009: *Complex Variables for Scientists and Engineers* (Math 463) - 32 students

- Spring 2009: *Introduction to Linear Algebra* (Math 240) - 220 students
- Fall 2008: *Partial Differential Equations for Scientists and Engineers* (Math 462) - 25 students

University of British Columbia

- Spring 2008: *Topics in Analysis* (**Graduate course**); *Topics in Differential Equations: Nonlinear PDEs* (**Graduate course**).
- Fall 2007: *Partial Differential Equations* - 100 students
- Spring 2007: *Elementary Differential Equations II* - 100 students
- Fall 2006: *Ordinary Differential Equations* - 100 students

University of Texas

- Spring 2006: *Calculus II* - 100 students
- Fall 2005: *Calculus II* - 100 students; *Introduction to Real Analysis* - 15 students
- Spring 2005: *Calculus II* - 100 students
- Fall 2004: *Calculus II* - 100 students; *Introduction to Real Analysis* - 15 students
- Spring 2004: *Calculus I* - 100 students
- Fall 2003: *Linear Algebra* - 15 students; *Ordinary Differential Equations* - 100 students

(b) **Course or Curriculum Development**

Developed and taught a new Graduate course on Nonlinear PDEs at the University of British Columbia.

## 4. Service

(a) **Professional**

i. **Reviewing activities for agencies**

- Member of NSF review panel
- Reviewer for the Natural Sciences and Engineering Research Council of Canada (NSERC)

ii. **Organization of Conferences**

- Co-organizer of the Workshop "Analysis of nonlinear PDEs and free boundary problems; Applications to homogenization" (PIMS-UBC July 20-24, 2009)

- Co-organizer of the Workshop "Kinetic Description of Multiscale Phenomena: Young Researchers Workshop" (CSCAMM - March 2-5, 2009)
- Co-organizer of the Workshop "Non-local operators and applications" (Banff April 28-May 2nd, 2008)

(b) **Campus services**

- Organizer of the PDE seminar (Spring 2009, Fall 2009, Spring 2010)
- Departmental Salary Committee (2009)