CURRICULUM VITÆ

Name:	Maciej (Martin) Krupa
Date of Birth	20/09/1959
Place of Birth	Bytom, Poland
Nationalities	Canadian and Polish

Address:
MathNeuro research team
INRIA Sophia Antipolis-Méditerranée
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06902 Sophia Antipolis Cedex, France
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Education:

Ph.D. Mathematics, 20/08/1988
University of Houston
Thesis Title: *Bifurcations of critical group orbits.*
Thesis Advisor: Professor M. Golubitsky

Masters in Mathematics, 1986
University of Waterloo, Canada

Honors in Mathematics, 1985
University of Guelph, Canada

Undergraduate student in Mathematics, 1978-1982
University of Warsaw, Poland

Positions held

- October 2012 – Present
  Advanced Research Position, Inria, France
- March 2012 – September 2012
  Visiting Researcher, Laboratoire de Mathématiques Appliquées du Havre, Université du Havre, France
- December 2010 – November 2011
  Visiting Professor, project REGATE (SISYPHE), Inria, France
- February 2008 – March 2011
  Research Fellow, Donders Institute, Radboud University, Nijmegen, NL
- February 2007 – February 2008
  Visiting Professor, Department of Mathematics, University of Twente, NL
- August 2002 – August 2008
  Associate Professor **(tenured position)**, Department of Mathematical Sciences
  New Mexico State University, Las Cruces, USA
- August 1999 – August 2002
  Assistant Professor, Department of Mathematical Sciences
  New Mexico State University, Las Cruces, USA

- June 1994 – July 1999
  Research Fellow, Institut für Angewandte und Numerische Mathematik
  Technical University Vienna, Vienna, Austria
- January 1991 – June 1994
  Assistant Professor **(permanent position)**, Department of Mathematics, University of Groningen, NL
- September 1990 – December 1990
  Postdoctoral Fellow, Department of Mathematics, University of Warwick, UK
- September 1989 – September 1990
  Postdoctoral Visiting Member, Institute for Mathematics and its Applications
  University of Minnesota, Minneapolis, USA
- September 1988 – September 1989
  Visiting Professor, School of Mathematics, University of Minnesota, Minneapolis, USA

Publications

64 publications appearing in international peer-reviewed journals or proceedings
More than 2500 citations and an h-index of 24 (source: GOOGLE SCHOLAR)

(10 Most cited publications)

- (MORE THAN 250 CITATIONS) M. Krupa and P. Szmolyan. Extending geometric singular perturbation theory to non-hyperbolic points – fold and canard points in two dimensions. *SIAM. J. Math. Anal.* **33**, 286–314 (2001).
- (MORE THAN 210 CITATIONS) M. Krupa and P. Szmolyan. Relaxation oscillations and canard explosion. *J. Differential Equations* **174**, 312–368 (2001).
- (MORE THAN 200 CITATIONS) M. Krupa. Bifurcations of relative equilibria. *SIAM J. Math. Anal.* **21**, 1453–1486 (1990).
- (MORE THAN 180 CITATIONS) M. Krupa. Robust heteroclinic cycles. *J. Nonlinear Sci.* **7**, 129–176 (1997).
- (MORE THAN 160 CITATIONS) M. Krupa and I. Melbourne. Asymptotic stability of heteroclinic cycles in systems with symmetry. *Ergodic Theory Dyn. Syst.* **15**, 121–148 (1995).
- (MORE THAN 110 CITATIONS) M. Brøns, M. Krupa and M. Wechselberger. Mixed mode oscillations due to the generalized canard phenomenon. *Fields Inst. Comm.* **49**, 39–63 (2006).
- (MORE THAN 90 CITATIONS) M. Krupa, B. Sandstede and P. Szmolyan. Fast and slow waves in the Fitzhugh-Nagumo equation. *J. Differential Equations* **133**, 49–97 (1997).
- (MORE THAN 90 CITATIONS) D.G. Aronson, M. Golubitsky and M. Krupa. Coupled arrays of Josephson junctions and bifurcations of maps with $\mathbf{S}_N$ symmetry. *Nonlinearity* **4**, 861–902 (1991).
- (MORE THAN 80 CITATIONS) M. Krupa, N. Popovic and N. Kopell, Mixed-mode oscillations in three timescale systems–a prototypical example. *SIAM J. Appl. Dyn. Syst.* **7**(2), pp. 361-420 (2008).
- (MORE THAN 70 CITATIONS) A. Homburg, H. Kokubu and M. Krupa. The cusp horseshoe and its bifurcations in the unfolding of an inclination-flip homoclinic orbit. *Ergodic Theory and Dynamical Systems* **14**, 667–693 (1994).

(10 Most recent publications)

- S. Rodrigues*, M. Desroches*, M. Krupa*, J. M. Cortes, T. J. Sejnowski and A. B. Ali*, Time-coded neurotransmitter release at excitatory and inhibitory synapses, *Proc. Natl. Acad. Sci. USA*, in press, 2016. (*: joint first author)
- E. Köksal-Ersöz, M. Desroches, M. Krupa and F. Clément, Canard-mediated (de)synchronization in coupled phantom bursters, *SIAM J. Appl. Dyn. Syst.*, in press, 2016.
- J. Burke, M. Desroches, A. Granados, T. J. Kaper, M. Krupa, and T. Vo, From Canards of Folded Singularities to Torus Canards in a Forced van der Pol Equation. *J. Nonlinear Sci.*, in press, 2015.
- P. Chossat and Krupa, Heteroclinic cycles in Hopfield networks. *J. Nonlinear Sci.*, in press, 2015.
- M. Krupa, J. D. Touboul, Complex oscillations in the delayed Fitzhugh-Nagumo equation, *J. Nonlinear Sci.* **26**, pp. 43–81, 2015.
- M. Krupa, J. D. Touboul. Canard explosion in delayed equations with multiple timescales. *J. Dyn. Diff. Eq.*, in press, 2015.
- J. D. Touboul, M. Krupa, M. Desroches. Noise-induced canard and mixed-mode oscillations in large-scale stochastic networks. *SIAM J. Appl. Math.* **75** pp. 2024–2049, 2015.
- S. Fernández-García, M. Desroches, M. Krupa and A. E. Teruel, Canard solutions in planar piecewise linear systems with three zones *Dynamical Systems: An International Journal*, in press, 2015.
- E. Benoît, M. Brøns, M. Desroches and M. Krupa, Extending the zero-derivative principle for slow-fast dynamical systems. *ZAMP* **66**, pp. 2255-2270, 2015.
- S. Fernández-García, M. Desroches, M. Krupa and F. Clément, A Multiple Time Scale Coupling of Piecewise Linear Oscillators. Application to a Neuroendocrine System, *SIAM J. Appl. Dyn. Syst.* **14**, pp. 643-673, 2015.

(Submitted articles)

- M. Desroches, M. Krupa, S. Rodrigues. Spike-adding mechanism in parabolic bursters: the role of folded-saddle canards. Submitted to Physica D, 2016.
- A. Granados, L. Alsedà and M. Krupa, Period adding and incrementing gluing bifurcations in one-dimensional piecewise-smooth maps: theory and applications. Under revision in SIAM Review, 2016.
- S. Fernández-García, M. Krupa, F. Clément, Mixed-Mode Oscillations in a piecewise linear system with multiple time scale coupling. Under revision in Physica D, 2016.
- D. Avitabile, M. Desroches, E. Knobloch and M. Krupa, Ducks in space. Submitted to SIAM J. Appl. Dyn. Syst., 2015.
- M. Desroches, S. Fernández-García, M. Krupa, Canards and spike-adding transitions in a minimal piecewise-linear Hindmarsh-Rose square-wave burster. Under revision in Chaos, 2016.

Supervision of students and postdocs

(As formal advisor)

- Victor Tschistiakov (PhD) (1993-1997), joint supervision with Stephan van Gils, University of Twente (The Netherlands).
- Suzanne Galayda (PhD) (2005-2010), joint supervision with Ernest Barany, New Mexico State University (USA).
- Lucile Megret (Master's thesis) (2013), joint supervision with Mathieu Desroches and Jean-Pierre Françoise, UPMC Paris, (France)

(Informal participation in supervision)

- Ale-Jan Homburg (1989-1993), supervisor: F. Takens, joint paper with the student, University of Groningen (The Netherlands).
- Martin Wechselberger (1996-1998), supervisor: P. Szmolyan, TU Vienna (Austria).
- Nikola Popovic (1999-2002), supervisor: P. Szmolyan, TU Vienna (Austria).
- Bruno Katzengruber (1994-1997), supervisor: P. Szmolyan, joint paper with student, TU Vienna (Austria).
- Martin Schagerl (1995-1998), supervisor: H. Troger, four joint papers with the student, TU Vienna (Austria).
- Mathieu Desroches (2006-2009), supervisors: B. Krauskopf & H. M. Osinga, University of Bristol (UK).
- Mario Dipoppa (2008-2011), supervisor B. Gutkin, joint paper with student, Ecole Normale Superieure (France)
- Lucile Megret (2014–present) supervisor J. P. Françoise and F. Clément, UPMC Paris, (France)
- Elif Köksal-Ersöz (2014–present) supervisor J. P. Françoise and F. Clément, UPMC Paris, (France), one joint paper.

(Extensive collaboration with postdoctoral fellows)

- Martin Wechselberger (2002-2005), Mathematical Biosciences Institute, Ohio State University (USA) – two joint papers.
- Jozsi Jalics (2003-2006), BioDynamics Institute, Boston University (USA) – one joint paper,
- Nikola Popovic (2004-2007), BioDynamics Institute, Boston University (USA) – two joint papers,
- Mathieu Desroches (2009–2011), University of Bristol, UK – two joint papers,
- Albert Granados (2012–2015), INRIA Paris-Rocquencourt, three joint papers, one joint paper submitted,
- Soledad Fernández-García (2012–present), INRIA Paris-Rocquencourt, two joint papers, two joint papers submitted.

Service to the Community

- Program committee member of the Second International Conference on Mathematical NeuroScience, to be held at Antibes-Juan Les Pins, France, May 30-June 1, 2016, (webpage)
- Co-organizer of the *Workshop on heteroclinic dynamics in neuroscience*, held at the University of Nice, France, Dec. 17-18, 2015 (webpage)
- Co-organizer of the *Workshop on topics in applied dynamical systems: equivariance and beyond*, held at Ohio State University, May 24-27, 2015 (webpage)
- program committee member of the First International Conference on Mathematical NeuroScience, held at Antibes-Juan Les Pins, France, June 8-10, 2015 (webpage)
- Co-organizer, workshop SloFaDyBio, towards a European network, Paris March 19-20, 2015
- "Slow-Fast Dynamics: Theory, Numerics and Applications to Life and Earth Sciences" held at Centre de Recerca Matematica, Barcelona (Spain), 3-7 June 2013. (webpage)
- Co-organizer, Minisymposium on slow fast systems and applications, at 9th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Orlando, Florida, USA, July 2012.
- Organizer, Minisymposium on non-hyperbolic problems in singular perturbation theory, SIAM Conference on Dynamical Systems, Snowbird, Utah, May 2009.
- Organizer, Minisymposium on non-hyperbolic problems in singular perturbation theory, SIAM Conference on Dynamical Systems, Snowbird, Utah, May 2005.
- Panelist, NSF panel for the Applied Dynamical Systems program, February 2005.
- Four NSF and one NSERC applied mathematics grant proposal reviews.
- Numerous referee's reports for the following journals: SIAM J. Math. Anal., SIAM J. Appl. Math, Physica D, J. Differential Equations, Nonlinearity, J. Nonlinear Sci., SIAM J. Appl. Dyn. Sys., J. of Math. Neurosci., Proc. Natl. Acad. Sci. USA, and for many conference proceedings.

Recent Presentations

- First International Conference on Mathematical Neuroscience, Juan les Pins, France, June 8-10, 2015. *The role of canards in transition to bursting and spike adding*
- Dynamical Systems joint seminar UB-UPC, April 8, 2015, *Slow-fast dynamics and canards in mathematics and neuroscience*
- workshop SloFaDyBio, Paris March 19-20, 2015, *Multiple timescales in mathematics and neuroscience*
- Bernoulli Lecture IV, Ecole Polytechnique Federale Lausanne (EPFL), November 2014. Title: *Snapshots out of the later life of canards*
- 2 mini-symposium talks at 10th AIMS Conference on Dynamical Systems, Differential Equations and Applications, July 2014. Titles: *Mixed-Mode Bursting Oscillations* and *Canard explosion in delayed differential equations*
- Invited talk, Complex Systems Dynamics (CoSyDy) Meeting: Complex Dynamics in Neuroscience, University of Warwick UK, June 2014, Title: *Multiple timescales, canards, mixed-mode oscillations and bursting in mathematical neuroscience*

- Invited talk, Colloquim Université La Rochelle, December 2013. Title: *Mixed-mode bursting oscillations.*
- Seminar, INRIA Neuromathcomp, Sophia Antipolis, October 2012. Title: *Canards and mixed-mode oscillations*
- Dynamical systems seminar, Laboratoire Jacques-Louis Lions, Paris 6, February 2012. Title: *Mixed-mode oscillations in a multiple time-scale phantom burster.*
- Séminaire de mathématique, Université du Havre, January 2012. Title: *Mixed-mode oscillations in a multiple time-scale phantom burster.*
- Invited talk, Colloquim ANAR Université La Rochelle, December 2011. Title: *Canards and Inflection.*
- Minisymposium talk, Equadiff 2011, August 2011. Title: *Canards and Inflection.*
- Séminaire SIgnaux et SYstèmes en PHysiologie et ingénieriE (SISYPHE), January 2011, Rocquencourt. Title: *Gamma rhythm with pyramidal cells firing in clusters.*
- Seminar of the Institut Henri Poincaré (IHP), Mathematics and Neuroscience, December 2010. Title: *Gamma rhythm with pyramidal cells firing in clusters.*
- Seminar of the Institut des Systèmes Complexes (ISC-PIF), May 2010. Title: *Gamma rhythm with pyramidal cells firing in clusters.*
- Seminar on Oscillatory and stochastic dynamics in thalamo-cortical networks, CNRS Unité de Neurosciences Information et Complexité, May 2010, Gif-sur-Yvette. Title: *Mixed-mode oscillations in a model of a dopamine neuron.*
- NeuroMathComp Seminar, Université de Nice Sophia-Antipolis (JAD Laboratory), 23 April 2010, Sophia-Antipolis. Title: *Gamma rhythm with pyramidal cells firing in clusters.*
- Dynamical systems seminar of the Laboratoire Jacques-Louis Lions, Paris 6, April 2010, Paris. Title: *Folded saddle-node of type II.*
- Group of Neural Theory Seminar, École Normale Supérieure, February 2010, Paris. Title: *Stimulus selection through neuronal synchronization.*

Awards and Grants since 2000

- Paris Sciences et Lettres, Structuring of Research, co-investigator (PI Boris Gutkin), 2014-2015.
- From spiking neurons to brain waves, a Computational Life Sciences (CLS) NWO grant, Stan Gielen (PI), Radboud University Nijmegen (2008-2012),
- Dynamics of neuronal systems, NWO Bezoekersbeurs, University of Twente, Stefan van Gils (PI), Enschede (2007-2008),
- Dynamics related to the presence of canard solutions, Individual NSF research grant (2004-2007), New Mexico State University, USA, `http://www.nsf.gov/awardsearch/showAward.do?AwardNumber=0406608`.
- The New Mexico State University Mathematical Sciences Department Summer Research Award (2003).
- Dynamics of hybrid systems, Institute for Complex Additive Systems Analysis, New Mexico Institute for Mining and Technology, 2001.
- The New Mexico State University Mathematical Sciences Department Summer Research Award, 2000.

Teaching positions

- Visiting professor at University of Minnesota (1988-1989)
- Assistant Professor at University of Groningen (1991-1994)
- Assistant/Associate Professor at New Mexico State University (1999-2006).

Courses taught while holding teaching positions

- entry level: calculus, linear algebra
- advanced (3rd/4th year undergraduate): linear algebra, ordinary differential equations, partial differential equations, complex analysis, applied mathematics, differential geometry,
- graduate level: complex analysis, differential equations, dynamical systems, perturbation analysis, classical mechanics.

Courses taught elsewhere

- Dynamics and symmetry, University of Illinois, Champaign, USA (1997)
- Classical Mechanics, Vienna University of Technology, Vienna (1998)
- Dynamics of slow/fast systems, Twente University (2007)

Complete list of publications

(Publications in scientific journals)

[**1**] M. Krupa. Bifurcations of relative equilibria. *SIAM J. Math. Anal.* **21**, 1453-1486 (1990).

[**2**] S.A. van Gils, M. Krupa and W.F. Langford. Hopf bifurcation with nonsemisimple $1:1$ resonance. *Nonlinearity* **3**, 825-850 (1990).

[**3**] M. Golubitsky, M. Krupa and C. Lim. Time-reversibility and particle sedimentation. *SIAM J. Appl. Math.* **51**, 49-72 (1991).

[**4**] D.G. Aronson, M. Golubitsky and M. Krupa. Coupled arrays of Josephson junctions and bifurcations of maps with $\mathbf{S}_N$ symmetry. *Nonlinearity* **4**, 861-902 (1991).

[**5**] M. Krupa and M. Roberts. Symmetry breaking and symmetry locking in equivariant circle maps. *Physica D* 57, 417-435 (1992).

[**6**] D.G. Aronson, S.A. van Gils and M. Krupa. Homoclinic twist bifurcations with $\mathbf{Z}_2$ symmetry. *Journal of Nonlinear Science* **4**, 195-219 (1994).

[**7**] A. Homburg, H. Kokubu and M. Krupa. The cusp horseshoe and its bifurcations in the unfolding of an inclination-flip homoclinic orbit. *Ergodic Theory and Dynamical Systems* **14**, 667-693, (1994).

[**8**] M. Krupa and I. Melbourne. Asymptotic stability of heteroclinic cycles in systems with symmetry. *Ergodic Theory Dyn. Syst.*, **15**, 121-148 (1995).

[**9**] D.G. Aronson, M. Krupa and P.B. Ashwin. Semirotors in Josephson junctions equations. *J. Nonlinear Sci.* **6**, 85-103 (1995).

[**10**] P. Chossat, M. Krupa, I. Melbourne and A. Scheel. Transverse bifurcations of homoclinic cycles. *Physica D* **100**, 85-100 (1997).

[**11**] M. Krupa, B. Sandstede and P. Szmolyan. Fast and slow waves in the Fithugh-Nagumo equation. *J. Differential Equations* **133**, 49-97 (1997).

[**12**] M. Krupa. Robust heteroclinic cycles (review article). *J. of Nonlinear Sci.* **7**, 129-176 (1997).

[**13**] P. Chossat, M. Krupa, I. Melbourne and A. Scheel. Magnetic dynamos in rotating

convection – a dynamical systems approach. *Dyn. Cont. Discr. Impulsive Syst.* **5**, 327-340 (1999).

[**14**] B. Katzengruber, M. Krupa, P. Szmolyan. Bifurcation of travelling waves in extrinsic semiconductors. *Physica D* **144**, 1-19 (2000).

[**15**] S. A. van Gils, M. Krupa and V. Tchistiakov. Homoclinic twist bifurcation in a system of two coupled oscillators. *JDDE* **12**, 733-806, (2000).

[**16**] M. Krupa and P. Szmolyan. Extending geometric singular perturbation theory to non-hyperbolic points – fold and canard points in two dimensions. *SIAM. J. of Math. Anal.* **33**, 286-314 (2001)

[**17**] M. Krupa and P. Szmolyan. Relaxation oscillations and canard explosion. *J. Differential Equations* **174**, 312-368 (2001)

[**18**] M. Krupa, M. Schagerl, A. Steindl, H. Troger, Stability of Relative Equilibria, Part I: Comparison of Four Methods (expository article), *Meccanica* **35**, 325-351, (2001)

[**19**] M. Krupa, A. Steindl, H. Troger, Stability of Relative Equilibria, Part II: Dumbell Satellites, *Meccanica* **35**, 353-371, (2001)

[**20**] M. Krupa, M. Schagerl, A. Steindl, P. Szmolyan and H. Troger. Relative equilibria of tethered satellite systems and their stability for very stiff tethers. Dyn. Syst. **16**, 253–278 (2001).

[**21**] M. Krupa and P. Szmolyan. Extending slow manifolds near transcritical and pitchfork singularities. Nonlinearity **14**, 1473–1491. (2001)

[**22**] M. Krupa, I. S. Melbourne. Asymptotic stability of heteroclinic cycles in systems with symmetry, II. *Proc. Roy. Soc. Edinburgh* A 134A, p. 1177-1197, (2004)

[**23**] S.A. van Gils, M. Krupa and P. Szmolyan. Asymptotic expansions using blow-up. *ZAMP* **56**, 369-397, (2005)

[**24**] M.Krupa, W. Poth, M. Schagerl, A. Steindl, W. Steiner, H. Troger, G. Wiedermann. Modelling, dynamics and control of tethered satellite systems. *Nonlinear Dynam.* **43** 73-96 (2006)

[**25**] E. Barany and M. Krupa, Stability of multiple access network control schemes with carrier sensing and exponential backoff, *Physica A* **363** 573-590 (2006)

[**26**] M. Golubitsky and M. Krupa. Stability Computations for Nilpotent Hopf Bifurcations in Coupled Cell Systems. *International Journal of Bifurcation and Chaos* **17** pp. 2595-2603 (2007)

[**27**] M. Krupa, N. Popovic and N. Kopell. Mixed-mode oscillations in three timescale systems–a prototypical example. *SIAM J. Appl. Dyn. Sys.*, **7** (2) pp. 361-420 (2008).

[**28**] M. Krupa, N. Popovic, N. Kopell and H. G. Rotstein. Mixed-mode oscillations in a three timescale model of a dopamine neuron. *Chaos*, **18**(2), p. 015106 (2008).

[**29**] H. Cagnan, H. Meijer, S. van Gils, M. Krupa, T. Heida, M. Rudolph, W. Wadman and H. Martens. Frequency-selectivity of a thalamocortical relay neuron during Parkinson's disease and deep brain stimulation: a computational study. *Eur. J. Neurosci.* **30**(7), pp. 1306-1317 (2009)

[**30**] J. Jalics, M. Krupa and H. G. Rotstein. A novel canard-based mechanism for mixed-mode oscillations in a neuronal model. *Dynamical Systems – International Journal* **25** (4), pp. 445-482, (2010).

[**31**] C. Börgers, S. Gielen, and M. Krupa. The response of a population of classical Hodgkin-Huxley neurons to an inhibitory pulse. *Journal of Comp. Neurosci.* 28, 509-526 (2010)

[**32**] S. Gielen, M. Krupa, M. Zeitler. Gamma oscillations as a mechanism for selective

information transmission. *Biological Cybernetics*, **103** (2), pp. 151-165 (2010)
[**33**] M. Krupa and M. Wechselberger. Local analysis near a folded saddle-node singularity. *J. Differential Equations* **248**(12), pp. 2841-2888 (2010).
[**34**] H. Meijer, M. Krupa, H. Cagnan T. Heida, H. Martens and S. van Gils. From parkinsonian thalamic activity to suppression by Deep Brain Stimulation: new insights from computational modeling. *J. Neur. Eng.* **8**(6), p. 066005 (2011).
[**35**] M. Dipoppa, M. Krupa, A. Torcini and B. Gutkin. Splay states in excitatory finite size neural networks subjected to pulses of finite amplitude and duration. *Siam J. Appl. Dyn. Syst.* **11**(3), pp. 864-894 (2012).
[**36**] M. Krupa, A. Vidal, M. Desroches and F. Clément. Mixed-Mode Oscillations in a Multiple Time Scale Phantom Bursting System. *SIAM J. Appl. Dyn. Syst.* **11**(4), pp. 1458-1498 (2012).
[**37**] M. Desroches, M. Krupa and S. Rodrigues. Canards, inflection and excitability threshold in neuronal models. *J. Math. Biol.* **67**(4), pp. 989-1017 (2013).
[**38**] M. Krupa, A. Vidal and F. Clément. A Network Model of the Periodic Synchronization Process in the Dynamics of Calcium Concentration in GnRH Neurons. *The Journal of Mathematical Neuroscience* **3**:4 (2013).
[**39**] L. Fontolan, M. Krupa, A. Hyafil and B. Gutkin. Analytical insights on theta-gamma coupled neural oscillators. *The Journal of Mathematical Neuroscience* **3**:16 (2013).
[**40**] M. Desroches, T. J. Kaper and M. Krupa. Mixed-mode bursting oscillations: Dynamics created by a slow passage through spike-adding canard explosion in a square-wave burster. *Chaos* **23**(4), p. 046106 (2013).
[**41**] H. W. Broer, T. J. Kaper and M. Krupa. Geometric Desingularization of a Cusp Singularity in SlowFast Systems with Applications to Zeeman's Examples. *J. Dyn. Diff. Equat.* **25**(4), pp. 925-958 (2013).
[**42**] M. Krupa, B. Ambrosio and M. A. Aziz-Alaoui. Weakly coupled two fast-two slow systems, folded node and mixed-mode oscillations. *Nonlinearity* **27** (7), pp. 1555-1575, 2014.
[**43**] A. Granados, M. Krupa and F. Clément, Border collision bifurcations of stroboscopic maps in periodically driven spiking models, *SIAM J. Appl. Dyn. Sys.* **13**(4), pp. 1387-1416, 2014.
[**44**] M. Krupa, S. Gielen and B. Gutkin, Adaptation and shunting inhibition leads to pyramidal/interneuron gamma with sparse firing of interneurons. *J. Comput. Neurosci.* **37** (2) pp. 357-376, 2014.
[**45**] A. Granados and M. Krupa, Firing-rate, symbolic dynamics and frequency dependence in periodically driven spiking models: a piecewise-smooth approach, *Nonlinearity* **28**, pp. 1163-1192, 2015.
[**46**] M. Brøns, M. Desroches, M. Krupa, Mixed-mode oscillations due to a singular Hopf bifurcation in a forest pest model. *Math. Popul. Stud.* **22** (5): 71-79, 2015.
[**47**] S. Fernandez-Garcia, M. Desroches, M. Krupa and F. Clément, A Multiple Time Scale Coupling of Piecewise Linear Oscillators. Application to a Neuroendocrine System, *SIAM J. Appl. Dyn. Syst.* **14** (2): 643-673, 2015.
[**48**] E. Benoît, M. Brøns, M. Desroches and M. Krupa, Extending the zero-derivative principle for slow-fast dynamical systems. *ZAMP* **66**, pp. 2255-2270, 2015.
[**49**] J. D. Touboul, M. Krupa, M. Desroches. Noise-induced canard and mixed-mode oscillations in large-scale stochastic networks. *SIAM J. Appl. Math*, **75** pp. 2024–2049, 2015.

[**50**] M. Krupa, J. D. Touboul, Complex oscillations in the delayed FitzHugh-Nagumo equation, *J. Nonlinear Sci.*, in press 2015.

[**51**] S. Fernández-García, M. Desroches, M. Krupa and A. E. Teruel, Canard solutions in planar piecewise linear systems with three zones *Dynamical Systems: An International Journal*, in press, 2015.

[**52**] M. Krupa, J. D. Touboul. Canard explosion in delayed equations with multiple timescales. *J. Dyn. Diff. Eq.*, in press 2015.

[**53**] P. Chossat and Krupa, Heteroclinic cycles in Hopfield networks. *J. Nonlinear Sci.*, in press 2015.

[**54**] J. Burke, M. Desroches, A. Granados, T. J. Kaper, M. Krupa and T. Vo, From Canards of Folded Singularities to Torus Canards in a Forced van der Pol Equation. *J. Nonlinear Sci.*, in press 2015.

[**55**] E. Köksal-Ersöz, M. Desroches, M. Krupa and F. Clément, Canard-mediated (de)synchronization in coupled phantom bursters, *SIAM J. Appl. Dyn. Syst.*, in press, 2015.

[**56**] S. Rodrigues, M. Desroches, M. Krupa, J. M. Cortes, T. J. Sejnowski and A. B. Ali, Time-coded neurotransmitter release at excitatory and inhibitory synapses, *Proc. Natl. Acad. Sci. USA*, in press, 2016.

Publications in conference proceedings

[**57**] A. Vanderbauwhede, M. Krupa and M. Golubitsky. Secondary bifurcations in symmetric systems. *Proc. Equadiff Conference 1987*, Lecture Notes in Pure and Applied Mathematics, **118**, Marcel Dekker, New York, Basel (1989).

[**58**] D.G. Aronson, S.A. van Gils and M. Krupa. Homoclinic twist and bifurcation. In: *Bifurcation and Symmetry*, edited by E. Allgower, K. Böhmer and M. Golubitsky, *International Series of Numerical Mathematics*, Birkhäuser, Basel (1992).

[**59**] M. Krupa and I. Melbourne. Nonasymptotically stable attractors in $\mathbf{O}(2)$ mode interactions. *Fields Institute Communications* **4**, 219-233 (1995).

[**60**] M. Krupa, M. Schagerl, A. Steindl and H. Troger. Relative equilibria of tethered satellite systems and their stability. Proceedings ICIAM 95, *ZAMM* Special Issue **4**, 312-316 (1996).

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