

CURRICULUM VITAE

February, 2010

H. DIETER ARMBRUSTER

Arizona State University,
School of Mathematical and Statistical Sciences
Tempe, AZ 85287-1804
USA
Phone (480) 965 5441
email: armbruster@asu.edu

Nationality: German and US
married to Charlotte Armbruster, 2 children

Education:

Zeppelin Gymnasium, Stuttgart, West Germany 1965 - 1973
University of Tübingen, Tübingen, West Germany 1975 - 1980

Degrees:

Abitur 1973
Diplom in physics 1980
Ph. D. in physics 1984 (summa cum laude)
Habilitation in Mathematical Physics 1990

Present Status:

Professor with tenure at the School of Mathematical and Statistical Sciences
at Arizona State University
Part-time Professor at the Department of Mechanical Engineering at the
Eindhoven University of Technology (Netherlands) since 1/2006

Previous Employments:

Research Assistant at the University of Tübingen supported by the Stiftung
Volkswagenwerk from April 1982 to March 1985.
Hochschulassistent at the University of Tübingen from April 1985 to De-
cember 1989.
Postdoctoral Research Assistant at the Mathematical Sciences Institute and
at the Department for Theoretical and Applied Mechanics at Cornell Uni-

versity from September 1986 to August 1988.

Associate Professor at Arizona State University from January 1990 to June 1992

Full Professor at Arizona State University since June 1992

Visiting Professor, Muroran Institute of Technology, Japan March 2002

Visiting Professor at the University of Potsdam, Germany Fall 2002

Visiting Professor at the Eindhoven University of Technology, 2003 and 2004

Part-time Professor at the Department of Mechanical Engineering at the Eindhoven University of Technology (Netherlands) 1/2006-

Interim Chair of the Department of Mathematics and Statistic at Arizona State University, 2005-2008

Research interests:

Theory of dynamical systems, bifurcation theory, chaos, symmetries in dynamical systems, finite dimensional attractors in nonlinear PDEs, applications to nonlinear problems in physics and biology: nonlinear optics, turbulence, solid state physics, reaction diffusion problems; dynamics and functionality of networks; industrial mathematics: supply chain dynamics and scheduling problems

Teaching experience

Graduate courses on Computer Algebra in dynamical systems (Tübingen and Cornell), differential equations, nonlinear dynamics and chaos (Tübingen and ASU), information theory and chaos (Tübingen), population dynamics and game theory (ASU). Undergraduate math modeling project courses in collaboration with INTEL and Lockheed Martin. Standard undergraduate courses in Mathematics (ASU). Organization of seminars and supervising research for theses of graduate students at ASU. Developed a 1 year seminar/course on Preparing Future Mathematics Faculty. Developed a Curriculum for the introductory ODE course taught in a Computer lab. Together with Eric Kostelich I have written a textbook on that subject which was published by Addison Wesley in fall 1996.

Recent Service

Director of the Applied Math Ph.D program 2008- 2009

Steering committee member ASU Center for Social Dynamics and Complexity 2008-2009

Steering committee member for the "Bio-inspired Logistics" grant of the Daimler -Benz Foundation 2007- 2009

Faculty Senator 2003-2005

Member of the Chair Search Committee, 2004-2005
Focus Group leader for the ASU Responsive Ph.D. Initiative, 2002
Member of the Graduate Council to the Dean of the Graduate College 2001-2004
Associate Chair, Director for Graduate Studies, Fall 2001, 1997 - 1999
Member of the Personnel Committee 2001-2002, 94-95
Acting Department Chair Spring 2000
Member of the Preparing Future Faculty Steering Committee, 1998- 2005

Publications

1. D.Armbruster, G.Dangelmayr: Singularities in phonon focusing due to nonlinear dispersion, *Z.Krist.* 162 (1), 236 (1983)
2. G.Dangelmayr, D.Armbruster: Classification of $Z(2)$ -equivariant imperfect bifurcations with corank two, *Proc. Lond. Math. Soc.* 46 (3), 517 (1983)
3. D.Armbruster, G.Dangelmayr: Topological singularities and phonon focusing, *Z.Phys. B* 52, 87 (1983)
4. D.Armbruster: An organizing center for optical bistability and self-pulsing, *Z.Phys. B* 53, 157 (1983)
5. D.Armbruster, G.Dangelmayr, W.Güttinger: Nonlinear phonon focusing, in *Phonon Scattering in Condensed Matter*, Editors W. Eisenmenger et al. p. 75 Springer 1984
6. D.Armbruster: Bifurcation geometry of optical bistability and self-pulsing, in *Optical Bistability 2*, Editors Ch.M.Bowden et al. p. 173 Plenum 1984
7. D.Armbruster, G.Dangelmayr: Structurally stable bifurcations in optical bistability, in *Nonequilibrium Cooperative Phenomena in Physics and Related Fields*, Editor M.G.Velarde p.137 Plenum 1984
8. D.Armbruster, G.Dangelmayr, W.Güttinger: Imperfection sensitivity of interacting Hopf- and steady-state bifurcations and their classification, *Physica* 16D, 99 (1985)
9. D.Armbruster, G.Dangelmayr: Structurally stable transitions in optical tristability, *Il Nuovo Cimento* 85B (2), 125 (1985)
10. G.Dangelmayr, D.Armbruster, M.Neveling: A codimension three bifurcation for the laser with saturable absorber, *Z.Phys. B.* 59, 365 (1985)
11. D.Armbruster: Bifurcation theory and Computer Algebra: An initial approach, in *Proceedings of EUROCAL 85 Vol. 2* Editor B. Caviness, Springer *L.N.Comp.Sci.* 204, p. 126 (1985)
12. D.Armbruster, H.Kredel: Constructing universal unfoldings using Gröbner bases, *J. of Symbolic Computation* 2, 383 (1986)

13. G.Dangelmayr, M.Neveling, D.Armbruster: Structurally stable phase portraits for the five-dimensional Lorenz equations, *Z.Phys. B.* 64, 491 (1986)
14. G.Dangelmayr, D.Armbruster : Steady state mode interactions in the presence of $O(2)$ -symmetry and in non-flux boundary value problems, in *Multiparameter Bifurcation Theory*, Editors M.Golubitsky, J.Guckenheimer, *AMS Contemp. Math.* 56, 53 (1986)
15. D.Armbruster, G.Dangelmayr: Corank two bifurcations for the Brusselator with non-flux boundary conditions, *Dynamics and Stability of Systems* 1 (3), 187 (1986)
16. D.Armbruster, M.Neveling: The butterfly singularity in double-diffusive convection, *J. Non-Equilib. Thermodyn.* 12, 313 (1987)
17. D.Armbruster, G.Dangelmayr: Coupled stationary bifurcations in non-flux boundary value problems, *Math. Proc. Camb. Phil. Soc.* 101, 167 (1987)
18. D.Armbruster: $O(2)$ -symmetric bifurcation theory for convection rolls, *Physica* 27D, 433 (1987)
19. D.Armbruster: Computer Algebra programs for dynamical systems theory, in *The Physics of Structure Formation*, Editors W.Güttinger, G.Dangelmayr, p. 417 Springer (1987)
20. D.Armbruster, J.Guckenheimer, Ph.Holmes: Heteroclinic cycles and modulated travelling waves in systems with $O(2)$ symmetry, *Physica* 29D, 257 (1988)
21. W.Zimmermann, D.Armbruster, L.Kramer, W.Kuang: The effect of spatial modulations on Codimension-2 bifurcations, *Europhys. Lett.* 6 (6), 505 (1988)
22. D.Armbruster, J.Guckenheimer, Ph.Holmes: Kuramoto-Sivashinsky dynamics on the center-unstable manifold, *SIAM J. of Applied Math.* 49 (3), 676 (1989)
23. D.Armbruster: Persistent heteroclinic orbits, in: "The Connection Between Infinite Dimensional and Finite Dimensional Dynamical Systems", eds: B.Nicolaenko et al, *AMS Contemp. Math.* 99, 93-103 (1989)

24. D.Armbruster, J.Guckenheimer, S.Kim: Chaotic dynamics in systems with square symmetry, *Physics Letters A* 140, 416 (1989)
25. D.Armbruster: More on structurally stable H-orbits, in: *Proceedings of the BTNA, Xian P.R.China*, Eds: Li Kaitai et al (1989)
26. D.Armbruster, G.Dangelmayr: Circuit induced oscillations of SNDC semiconductors, *Physics Letters A* 138, 46 (1989)
27. D.Armbruster, P.Chossat: Heteroclinic orbits in a spherically invariant system, *Physica D* 50, 155-176 (1991)
28. P.Chossat, D.Armbruster: Structurally stable heteroclinic cycles in a system with $O(3)$ -symmetry, in "Singularity Theory and its Applications", Warwick 1989, Part II, eds: M.Roberts, I. Stewart, Springer Verlag 38-62 (1991)
29. D.Armbruster: Codimension 2 bifurcation in binary convection with square symmetry, in: *Proceedings of the NATO ASI Streitberg* (1989) eds. F.Busse, L.Kramer
30. D.Armbruster: Square and almost square symmetry in binary convection, *Eur. J. Mech. B/Fluids* 10 No 2-suppl., p 7-12 (1991)
31. D.Armbruster, J.Guckenheimer, S.Kim: Resonant Surface Waves in a square container, in: *Differential Equations and Computer Algebra*, ed. M. Singer, Academic Press, p 61-76 (1990)
32. M.Kirby, D.Armbruster, W.Güttinger: An approach for the analysis of spacially localized oscillations, *International Series of Numerical Math.* 97, Birkhäuser Verlag, 1991, p. 183
33. M.Kirby D.Armbruster: Reconstructing phase space for PDE simulations, *ZAMP* 43, p. 999-1022 (1992)
34. D.Armbruster, R.Heiland, E.Kostelich, B.Nicolaenko: Phase-space analysis of bursting behavior in Kolmogorov flow, *Physica D* 58, p. 392-401 (1992)
35. D.Armbruster, A.Mahalov: On the explicit symmetry breaking in the Taylor-Couette problem, *Physics Letters A* 167 p. 251-254 (1992)
36. D.Armbruster, E.Ihrig: Topological constraints for explicit symmetry breaking, *Lectures in Applied Mathematics* 29, p37-47 (1993)

37. D.Armbruster: Analyzing spatio-temporal complexity, in: 1st European Nonlinear Oscillator Conference, eds: E. Kreuzer, G. Schmidt, Akademie Verlag, 1993
38. D.Armbruster, R.Heiland, E.Kostelich: KLTOOL: a tool to analyze spatio-temporal complexity, *Chaos* **4** (2) p.421-424, (1994)
39. E.Kostelich, D.Armbruster: The ODE project at Arizona State University, in: Proceedings of the 6th International Conference on Technology in Collegiate Mathematics, 1994
40. D.Armbruster, B.Nicolaenko, N.Smaoui, P.Chossat: Analyzing bifurcations in the Kolmogorov flow equations, in: "Dynamics, Bifurcations and Symmetries", P.Chossat, ed. NATO ASI, Cargese 1993, Kluwer (1994)
41. D.Armbruster, E.Stone, R.Heiland: Towards analyzing the dynamics of flames, *Fields Institute Communications* **5**, p. 1-17 (1996)
42. D.Armbruster, B.Nicolaenko, N.Smaoui, P.Chossat: Symmetries and dynamics for 2-d Navier Stokes flow, *Physica D* **95**, p. 81-93, 1996
43. A.Palacios, D.Armbruster, E.Kostelich, E.Stone: Analyzing the dynamics of cellular flames, *Physica D* **96**, p. 132-161, 1996
44. S. Wang, P. Crouch, D. Armbruster: Bifurcation analysis of oscillations in electric power systems, Proceedings of the 35th Conference on Decision and Control, Kobe Japan, 1996
45. D.Armbruster: The (almost) complete dynamics of the FitzHugh Nagumo equations, in: "Nonlinear Dynamics", ed. A. Guran, World Scientific 1997, p. 89-102
46. N.Smaoui, D.Armbruster: Symmetry and the Karhunen-Loeve analysis, *SIAM Journal of Scientific Computing*, **18**(5), p. 1526-1532, 1997
47. J. Oprea, P.Chossat, D.Armbruster: Simulating the kinematic dynamo forced by heteroclinic convective velocity fields, *Theoretical and Computational Fluid Dynamics*, **9** (3/4), p. 293-310, 1997
48. E. Stone, D. Armbruster: Noise and $O(1)$ amplitude effects on heteroclinic cycles, *CHAOS*, **9**(2) p.499-506, (1999)

49. I. Diaz-Rivera, D. Armbruster, T. Taylor: Periodic orbits in a class of re-entrant manufacturing systems, *Mathematics of Operations Research* **25**(4), p. 708 - 725, 2000
50. D. Hanson, D. Armbruster, T. Taylor: On the stability of re-entrant manufacturing systems, in *Proceedings of the 31st MTNS, Padua 1998 Mathematical Theory of Networks and Systems*, Beghi et al editors p. 937-940 (1999) Il Poligrafo, Padova Italy
51. Dieter Armbruster, Pascal Chossat: Remarks on multi-frequency oscillations in symmetrically coupled oscillators, *Physics Letters A*, **254**, p. 269-274, (1999)
52. Dieter Armbruster, Iuliana Oprea: Dynamical systems and the kinematic dynamo, in: *Nonlinear Instability, Chaos and Turbulence Vol II.*, L.Debnath, D.Riahi, eds (2000), p. 163-193
53. Ying-Cheng Lai, Dieter Armbruster and Eric J. Kostelich: Intermittency in chaotic rotations, *Phys. Rev. E* **62**(1), R29-R32 (2000)
54. Ying-Cheng Lai, Dieter Armbruster and Eric J. Kostelich: Reply to "Comment on Intermittency in chaotic rotations", *Phys. Rev. E* **64**, 058204(1-3) (2001)
55. Dieter Armbruster, Marguerite George and Iuliana Oprea: Parametrically forced pattern formation, *Chaos*, **11**(1), pp 52-56, (2001).
56. Daniel Marthaler, Dieter Armbruster, Ying-Cheng Lai and Eric J. Kostelich: Perturbed on-off intermittency, *Phys. Rev. E.* **64** 016220-1 - 9, (2001)
57. Dieter Armbruster: PFMF at Arizona State University, *Focus* **21**(1), p 6-7, (2001)
58. Dieter Armbruster, Pascal Chossat, Iuliana Oprea: Structurally stable heteroclinic cycles and the dynamo dynamics, in: *Proceedings of the NATO ARI, *Dynamo and Dynamics, a mathematical challenge**, eds. Chossat et al., p. 313-322, Kluwer (2001)
59. Dieter Armbruster, Rama Chidambaram, Gary Godding, Karl Kempf, Ines Katzorke: Modeling and analysis of decision flows in complex supply networks, in: *Proceedings of POMS 2001, Sao Paulo*, p 1106 - 1114, (2001)

60. Daniel Marthaler, Dieter Armbruster, Christian Ringhofer: A mesoscopic approach to the simulation of semiconductor supply chains, in: Proceedings of the International Conference on Modeling and Analysis of Semiconductor Manufacturing (MASM2002), G. Mackulak et al, eds, p 365 - 369 (2002)
61. Daniel Marthaler, Dieter Armbruster, Christian Ringhofer: A mesoscopic approach to the simulation of semiconductor supply chains, *Simulation* **79**(3), 2003.
62. Dieter Armbruster, Daniel Marthaler, Christian Ringhofer: Efficient simulations of supply chains, in: Proceedings of the 2002 Winter Simulation Conference, E. Yücesan, C.-H. Chen, J.L.Snowdon and J.M.Charnes, eds. pp. 1345 - 1348, (2002)
63. Pascal Chossat, Dieter Armbruster: Dynamics of polar reversals in spherical dynamos, *Proceedings of the Royal Society A, London*, **459**, 577-596 (2003).
64. Dieter Armbruster, Esmat Gel: Bucket brigades revisited: are they always effective?, *European Journal of Operational Research*, **172**,(1), 213-229, 2006
65. Dieter Armbruster, Daniel Marthaler, Christian Ringhofer, Karl Kempf, Tae-Chang Jo: A continuum model for a re-entrant factory, *Operations research* **54**(5), 933-950, 2006
66. Dieter Armbruster, Daniel Marthaler, Christian Ringhofer: Kinetic and fluid model hierarchies for supply chains, *SIAM Multiscale Model. Simul.* **2**(1), pp 43-61 2004
67. Dieter Armbruster, *Dynamical Systems and Production Systems*, Chapter I in *Nonlinear Dynamics of Production Systems*, G. Radons and R. Neugebauer, eds, Wiley-VCH Berlin, 2004
68. Bart Rem, Dieter Armbruster, Control and Synchronization in Switched Arrival Systems, *Chaos* **13** (1), 128-137 (2003)
69. Dieter Armbruster, Emily Stone and Vivien Kirk: Noisy heteroclinic networks, *Chaos* **13** (1), 71-79 (2003)
70. Tae-Chang Jo, Dieter Armbruster: Localized Solutions in Parametrically Driven Pattern Formation, *Phys. Rev. E* **68**, 016213 (2003)

71. D. Armbruster, C. Ringhofer, Thermalized kinetic and fluid models for reentrant supply chains, *SIAM J. on Multiscale modeling and Simulation*, **3**(4), pp 782 - 800, (2005)
72. D. Armbruster, C. Ringhofer, T-J. Jo, Continuous models for production flows, in: *Proceedings of the 2004 American Control Conference*, Boston, pp 4589 - 4594, 2004
73. Mingqiang Zhu, Dieter Armbruster, Ines Katzorke: Does synchronization of networks of chaotic maps lead to control?, *Chaos* **15** 014101, 2005
74. Dieter Armbruster, Tae-Chang Jo: Pattern formation and parametric resonance, in *Dynamics and bifurcation of patterns in dissipative systems*, Gerhard Dangelmayr, Iuliana Oprea eds, World Scientific, p 158-173, 2004.
75. D. Armbruster, P. Degond, C. Ringhofer: A Model for the Dynamics of large Queuing Networks and Supply Chains, *SIAM J. Applied Mathematics* **66**(3) pp. 896-920. 2006
76. D. Armbruster, P. Degond, C. Ringhofer: "Kinetic and fluid models for supply chains supporting policy attributes", *Bulletin of the Inst. Math., Academica Sinica* 2:433-460, 2007.
77. Dieter Armbruster, Esma Gel, Junko Murakami: Bucket brigades with worker learning *European Journal of Operational Research*, **176**, 264-274 (2007)
78. Dieter Armbruster, P. Degond, C. Ringhofer: Continuum models for interacting machines in: Dieter Armbruster, Alexander Mikhailov, Kunihiko Kaneko (eds): *Networks of Interacting Machines*, World Scientific, pp 1- 32, 2005,
79. Dirk Helbing, Dieter Armbruster, Alexander S. Mikhailov and Erjen Lefeber: Information and material flows in complex networks, short survey, *Physica A* **363**(1), Pages xi-xvi, 2006
80. D. Armbruster, C. de Beer, M. Freitag, T. Jagalski, C. Ringhofer Autonomous Control of Production Networks using a Pheromone Approach, *Physica A*, **363**(1), 104-114, 2006

81. Y. Zou, I.G. Kevrekidis, D. Armbruster: Multiscale analysis of re-entrant production lines: An equation-free approach, *Physica A*, **363**(1), 1-13, 2006
82. Dominique Perdaen, Dieter Armbruster, Karl Kemp, and Erjen Lefeber, Controlling a re-entrant manufacturing line via the push-pull point, *International Journal of Production Research*, Volume 46, Issue 16 August 2008 , pages 4521 - 4536
83. Dieter Armbruster, Erjen Lefeber: Aggregate modeling of manufacturing systems, to appear in Reha Uzsoy, Pinar Keskinocak and Karl Kempf: *Handbook of Production Planning*, Kluwer International Series in Operation Research and Management Science (2010)
84. Yun Kang, Dieter Armbruster and Yang Kuang: Dynamics of a plant-herbivore model. *Journal of Biological Dynamics*, **2**(2), 89-101, 2008
85. M.P.M. Hendriks, D. Armbruster, M. Laumanns, E. Lefeber, J.T. Udding: The strategic allocation of cyclically calling container vessels for multi-terminal container operators, preprint Eindhoven 2009, submitted
86. M.P.M. Hendriks, D. Armbruster, M. Laumanns, E. Lefeber, J.T. Udding: Design of robust distribution networks run by fourth party logistic service providers, preprint Eindhoven 2008, submitted
87. M.P.M. Hendriks, D. Armbruster, M. Laumanns, E. Lefeber, J.T. Udding, Strategic terminal allocation and time scheduling of cyclically arriving container vessels, *Proceedings of the 18th Triennial Conference of the International Federation of Operational Research Societies (IFORS)*, Sandton, South Africa, 14, 2008.
88. M.P.M. Hendriks, D. Armbruster, M. Laumanns, E. Lefeber, J.T. Udding, Strategic allocation of cyclically arriving container vessels to inter-related terminals, *Proceedings of the Workshop on Logistics Networks*, Dresden, Germany, 2007.
89. Michael La Marca, Dieter Armbruster, Michael Herty and Christian Ringhofer: Control of continuum models of production systems, to appear in *IEEE Transactions on automatic control*, 2010.
90. Yun Kang, Dieter Armbruster and Yang Kuang: Dynamics of plant-herbivore models with monotone plant growth rate, preprint ASU, 5/2008, submitted

91. Yun Kang, Dieter Armbruster and Yang Kuang: A two patch model for plant-herbivore interaction, preprint ASU 8/2008, submitted
92. A. Unver, C. Ringhofer and D.Armbruster: A Hyperbolic Relaxation Model for Product Flow in Complex Production Networks, Discrete and continuous dynamical systems Supplement 2009, pp. 790 - 799
93. Armbruster, Dieter; Rooda, J. (Koos); van de Rijt, Emiel; Nagy, John: Dynamic simulations of single molecule enzyme networks, J. Phys. Chem. B, 2009, **113** (16), 5537-5544
94. K.G.M. Jacobs, Dieter Armbruster, Erjen Lefeber and J.E. Rooda: On the equivalence of economic lot scheduling and switched production systems, preprint 2009.
95. D.Armbruster, M.P.M. Hendriks, E. Lefeber, J.T. Udding: Structural Properties of third-party logistics networks, to be published in the Proceedings of the 2nd International Conference on Dynamics in Logistics (LDIC 2009), Ed. H.-J. Kreowski et al, Bremen, 2010.
96. Dieter Armbruster, Erjen Lefeber and J.E. Rooda: On the stability of queuing networks and fluid models, preprint submitted, 2010

Books:

1. R.Rand, D.Armbruster: Perturbation Methods, Bifurcation theory and Computer Algebra, Springer Applied Mathematical Sciences 65 (1987)
2. E.Kostelich, D.Armbruster: Introductory Differential Equations, From Linearity to Chaos, Addison Wesley (1996)
3. Pascal Chossat, Dieter Armbruster, Iuliana Oprea eds.: *Dynamo and Dynamics, a mathematical challenge*, Kluwer 2001
4. Dieter Armbruster, Alexander Mikhailov, Kunihiko Kaneko (eds): *Networks of Interacting Machines*, World Scientific, 2005,

Title of Ph.D. Thesis (1984):

On the bifurcation geometry of structurally stable physical systems (in German), thesis advisor W. Güttinger, referees M.Dal Cin , R. Thom

Title of Habilitation Thesis (1990):

Nonlinear Dynamics and Bifurcation with Symmetry: New Routes to Chaotic Systems (in German), reports by F. Busse, J. Guckenheimer and W. Güttinger

Software:

KLTOOL: A program for analyzing spatio-temporal data, developed by R. Heiland, D.Armbruster and E.Kostelich, Arizona State University 1993

Grants awarded

Postdoctoral Research Associate at the Mathematical Sciences Institute,
Cornell University, 1986 - 1988

Research Grant from the "Deutsche Forschungsgemeinschaft" (DFG), 1986
- 1988

Co-investigator for the University Research Initiative on "Spatio-Temporal
Complexity and Large Scale Structures in Problems of Continuum
Mechanics" funded through the Air Force Office for Scientific Research
(B. Nicolaenko PI), 1989

Co-principal investigator for the proposal "Low dimensional dynamical
characterization of partial-differential equations" funded through the
NSF computational mathematics program (with E. Kostelich PI, and
B.Nicolaenko Co-PI), 1991

Co-principal investigator for the proposal "Symbolic Computation and Dif-
ferential Equations" funded through the NSF computational mathe-
matics program (with B. Grossman, R. Larson, and P. Crouch), 1991

"Workshop on dynamics of structures in turbulence", workshop held on
May 20 - May 25 1991 organized jointly with B. Nicolaenko, W. Saric
and H. Reed funded by the ONR and AFOSR.

Principal investigator for the proposal "Bifurcation et evolution des dy-
namos convectives dans un domaine spherique" approved as a collab-
oration proposal with Pascal Chossat by the NSF and funded by the
CNRS 1992

Co-director for the project "Computer laboratory classroom for undergrad-
uate Mathematics curriculum" (J. Bustoz, director; M. Kowski and E.
Kostelich, Co-directors) funded through NSF, 1992

Co-principal investigator for the proposal "From dynamical systems to co-
herent structures: Shadowing chaos within turbulence" funded through
AFOSR (B.Nicolaenko PI, A. Eden and E. Kostelich Co-PI), 1993

Co-director for the project "Comp. Classroom Lab. - Calculus for everyone
model for life sciences" (J. Bustoz, director; 5 Co-directors) funded
through NSF, 1994

Co-principal investigator for the proposal "Characterizing the Dynamics of Spatio-Temporal Data", (with E. Kostelich, PI) funded through Department of Energy 1994.

Principal investigator for the proposal "Characterizing the Dynamics of Spatio-Temporal Data", (with E. Kostelich, Co-PI) funded through NSF 1995.

Principal investigator for the proposal "Spatio-Temporal Dynamics in Spherically Symmetric Systems", a collaboration with Pascal Chossat, funded through NATO 1995.

Principal investigator for a National Research Council's Collaboration in Basic Science and Engineering short term visiting grant 1997

Pi for "Spatio-Temporal Dynamics in Spherically Symmetric Systems", NATO travel grant 97 - 99

Co-Pi Modeling and Analysis of Semiconductor Manufacturing Supply Chains funded through the Manufacturing Institute ASU, 1999

Pi for "Preparing Future Faculty in Mathematics at ASU", grant awarded from AMS, 1999-2001

Co-Pi for "A modular, scalable approach to modeling and analysis of semiconductor manufacturing supply chains, NSF, 2000

Pi for "Dynamo and dynamics, a mathematical challenge: A workshop at the Institut d'Etudes Scientifiques de Cargese, Corsica (France), NSF, 2000

Pi for "Dynamics and Control in Semiconductor Manufacturing Lines", NSF, 2000

Co-Pi for grant on modeling and control of supply chains from Intel, 2001-2003.

Co-Pi for "Intermountain/Southwest Conference on Industrial and Interdisciplinary Mathematics", NSF, 2001-2004

Pi for "Simulations of Semiconductor Supply Chains", Intel Research Council, 2002.

Pi for "Dynamics of Production and Supply Networks", NSF 2002- 2005

Pi for "Simulations of Semiconductor Supply Chains", Intel Research Council, 2003- 2004

Co-Pi of a grant from the Klaus Tschira Foundation to run an international workshop on "Networks of Interacting Machines: Industrial Production Systems and Biological Cells".

Co-Pi of an EU grant to run a Thematic Institute on Information and material flows in complex networks, June 2005,

Co-Pi for Emsw21-Mctp: Mentorship Through Research: A Model For An Emerging Urban American University, NSF 2005- 2010.

Co-Pi for "Multiscale Continuum Models For Large Production And Supply Networks", NSF 2006- 2009

Co-Pi for "Complex self-organizing networks of interacting machines: Principles of design, control, and functional optimization", VW Stiftung 2007 - 2010.

Pi for Learner-Centered Education Course Redesign Initiative (2006- 2009), College Algebra, Arizona Board of Regents.

Co-Pi on Computational Science Training for Undergraduates in the Mathematical Sciences (CSUMS), NSF 2007- 2012,

Forecasting Inter-Generation Product Transitions, Intel Research Council, 2008- 2010

Advising

Chair/Co-chair for Ph. D. and Masters theses of R. Heiland (Masters 1992), Shen Wang (Ph.D. Electrical Engineering 1996), Gil-Jun Han (Ph.D. 1996), Maya Mincheva (Masters 1997). Ivonne Diaz-Rivera (Ph.D. 1997), Mark Nelson (Masters 1998), Paul Mayfield (Masters 2000), Dan Marthaler (Masters, 2000), Dan Marthaler (Ph.D, 2002), Tae-Chang Jo (Ph.D. 2002), Rama Chidambaram (Ph.D. 2003) Michael Lamarca (Ph.D 2008), Yun Kang (Ph.D. 2008)

Workshops organized

Workshop on Synergetics. Joint meeting of the Institute for Information Sciences of the Universität Tübingen and the Institute for Theoretical Physics at the Universität Stuttgart, December 1989

Workshop on dynamics of structures in turbulence, May 1991, with B. Nicolaenko, W. Saric and H. Reed.

Member of the Organizing Committee for Dynamics Days 1993

Co-organizer of a symposium session for the 33rd Annual Technical Meeting of the Society of Engineering Science 1996

Member of the Organizing Committee for Dynamics Days 1997

Member of the Advisory Board for the Southwest Dynamical Systems Conference, 1997

Co-chair of the Organizing Committee for the Fifth SIAM Conference on Applications of Dynamical Systems, May 1999.

local organizer for the AMS/SIAM/MEU meeting on professional Masters degrees in Mathematics at ASU, November 1999.

Co-organizer for "Dynamo and dynamics, a mathematical challenge", France, 2000

Organizer for a Workshop on Transport in Supply Chains, Traffic and Biology, ASU January 2003

Co-organizer for "Intermountain/Southwest Conference on Industrial and Interdisciplinary Mathematics", Utah State University 2002, Colorado State University 2003, ASU 2004

Minisymposium organizer for SIAM Snowbird meetings, SIAM Industrial Mathematics Meeting, INFORMS, etc.

Co-organizer of a workshop on "Networks of Interacting Machines: Industrial Production Systems and Biological Cells", Berlin Germany, December 2003.

Program Co-Chair for SIAM Conference on Mathematics for Industry, Detroit, October 2005

Co-organizer of a Thematic Institute on *Information and material flows in complex networks*, Goldrain, June 2005

Organizer of "Dynamics and Control of Supply Chains", Eindhoven University of Technology, June 2007

Co-organizer for a Satellite Conference to the European Conference on Complex Systems 2007 on "Logistics Networks", Dresden, October 2007

Co-organizer of the Sapporo Winter School: Networks of interacting machines, February 2009

Member of Organizing Committee for SIAM Conference on Mathematics for Industry, San Francisco, October 2009

Some invited talks and research visits (last 10 years)

Chair and presenter in the Minisymposium on "Dynamics of Scheduling Problems" at the Fifth SIAM Conference on Application of Dynamical Systems, May 1999

Physics Colloquium, Universität Potsdam, Germany July 1999

AMS Western Section Meeting, Santa Barbara, March 2000

Workshop on Dynamics, Bifurcations and Patterns, Fort Collins, May 2000

Co-chair and presenter in the Minisymposium on "On-off intermittency and synchronization in chaotic systems" at the SIAM Pacific Rim Dynamical Systems Conference, August 2000,

NATO ARW "Dynamo and dynamics, a mathematical challenge", August 2000

Applied Math Colloquium, U of Arizona, September 2000,

3rd International Symposium "Investigation of nonlinear dynamic effects in production systems", Cottbus, Germany, September 2000

Invited minisymposium talk at the American Physical Society, March Meeting 2001

Chair and presenter in the Minisymposium on "Dynamics and control of manufacturing processes" at the Sixth SIAM Conference on Application of Dynamical Systems, May 2001

International Conference of the Production Operations Management Society POMS 2001, Sao Paulo, August 2001

Workshop on Control, communication and synchronization of chaotic dynamical systems, Dresden, October 2001

INFORMS annual meeting, Miami, November 2001

Visiting Professor, Muroran Institute of Technology, Muroran, Japan, 3/2002

Applied Math Seminar series (3 lectures), Colorado State University, September 2002

Workshop on Differential Equations and its applications (3 lectures), Istanbul September 2002.

Seminar series (5 lectures), Center for Dynamics in Complex Systems, University of Potsdam, October 2002

Seminar, Institut for Economics and Traffic, University of Dresden, October 2002

Graduiertenkolleg, Physikalisches Institut Universität Göttingen, November 2002

INFORMS annual meeting, San Jose, November 2002

Wintersim 2002, San Diego, December 2002

Seminar Nonlinear Dynamics Weierstrass Institut Berlin 4/2003

Talk at "Bifurcations, the use and control of chaos", Southampton, UK, 7/2003

Talk at "Investigations of Non-Linear Dynamic Effects in Production Systems" 4/2003 Chemnitz, Germany

Visiting Professor at the Eindhoven University of Technology, Netherlands, 3-4/2003 and 5-6/ 2004,

INFORMS annual meeting, Atlanta, November 2003, (minisymposium organizer, 2 talks)

Talk at Arizona Days, Los Alamos, January 2004

Talk at the 2004 American Control Conference, Boston, July, 2004

Talk at Thematic Institute "From many particle physics to multi-agent systems", Dresden 9/2004

Applied Math Seminar, Colorado State University, 11/2004

Colloquium Colorado State University, 3/2005

Seminar, School on Operations Management and Logistics, Eindhoven University of Technology, 6/2005

Thematic Institute "Information and Material Flows in Complex Networks", Goldrain, 7/2005

International Workshop on Applied Dynamical Systems Mechanics, Turbulence, Knots, Cockroaches, & Chaos, Montreal 11/2005

SIAM Conference on Mathematics in Industry, Detroit 10/2005

Colloquium University of Montana 12/2005

Colloquium, Department of Mathematics, University College London 3/2006

Colloquium, BIBA University of Bremen, Germany, 6/2006

EPT Workshop, Eindhoven University of Technology, 6/2006

Seminar, Intel Corporation, Chandler, 11/2006

Distinguished Speaker Series, School of Industrial and Systems Engineering, Georgia Tech, 10/2006

Workshop and Summer School "Mathematics for the science of complex systems", Warwick University, UK, 9/2006

Ladenburger Discourse 4/2007

"Simulation models for mesoscale systems: Between discrete event simulations and continuum approximations" Multi-scaled Mathematics in Defence Research and its Spin-offs, Lighthill Institute of Mathematical Sciences, London, 5/2007

"Controlling factory production", Colloquium, BIBA University of Bremen, Germany, 6/2007

"Complex production systems: from Biology to Semiconductor Fabs", Inaugural Lecture, TU Eindhoven, 6/2007

Workshop "Mathematical modeling of transport and production logistics", Bremen 1/2008

Ladenburger Discourse 2/2008

AIMS Conference on Dynamical Systems and Differential Equations, two presentations 5/2008

European Consortium For Mathematics in Industry, London 7/2008

AFOSR - Washington DC - Talk 3/2008

Dynamical Systems Seminar, UoA Tucson 11/2008

Planning Production and Inventories in the Extended Enterprise, NCSU, Industrial Engineering, 9/2008

Networks of interacting machines, Talk and Panel Discussion, Sapporo, 2/2009

Keynote speaker for 2nd International Conference on Dynamics in Logistics (LDIC 2009), Bremen, August 2009