

Curriculum vitae Cars Hommes, November 2018

PERSONAL INFORMATION

Name	Cars Hommes
Nationality	Dutch
Date of Birth	10 April, 1960
Affiliation	Amsterdam School of Economics, University of Amsterdam, Center for Nonlinear Dynamics in Economics and Finance (CeNDEF)
Address	Roeterstraat 11, NL-1018 WB Amsterdam
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EDUCATION

1991	Ph.D. in <i>Mathematical Economics</i> , University of Groningen, Netherlands Thesis: Chaotic Dynamics in Economic Models: some simple case-studies
1985	MSc in Mathematics, University of Groningen, Netherlands

CURRENT POSITIONS

1999 -	Professor of Economic Dynamics, University of Amsterdam
2007 -2012	Head Department of Quantitative Economics
1998 -	Director Center for Nonlinear Dynamics in Economics and Finance (CeNDEF)

PREVIOUS POSITIONS

1992 - 1999	Assistant Professor, Department of Economics, University of Amsterdam
1991 - 1992	Assistant Professor, Department of Economics, University of Groningen
1988 - 1991	PhD Student, Department of Economics, University of Groningen
1985 - 1987	University Lecturer, Department of Economics, University of Groningen

INSTITUTIONAL RESPONSIBILITIES

2007 - 2012	Head of Department of Quantitative Economics, University of Amsterdam
2004-2007	Director BSc and MSc Econometrics
1998-	Director Center for Nonlinear Dynamics in Economics and Finance (CeNDEF)

VISITING POSITIONS (SELECTED)

Feb- May 2014	Visiting Guest Professor New York University, NY, USA
1994-	Visiting Professor Department of Economics, University Wisconsin, USA, regularly, during summer periods
February 2013	Visitor Columbia University, New York, USA
July 2009	Honorary Professor, University of Technology, Sydney, Australia
2002-2006	Visiting Professor St. Anna School of Advanced Studies, Pisa, Italy, regularly
October 2005	Visiting Professor Peking University, Beijing, China
May 1997,1998	Visiting Professor Department of Finance, University of Vienna, Austria
July 1997	Visiting Scholar SITE, Stanford University, USA

FELLOWSHIPS AND HONORS

2017-2018	Wim Duisenberg Research Fellowship ECB
2014-2015	Distinguished Lorentz Fellow, Netherlands Institute of Advanced Studies
2014-2016	President Elect Society of Computational Economics
2009, January 8	“ere-promotor” honorary degree William Brock, University of Amsterdam
1995-	Fellow Tinbergen Institute

SCIENTIFIC BOARDS

2007 - 2015	Complexity Program Committee Dutch Science Foundation (NWO)
2011 -	Executive Committee Nonlinear Economic Dynamics Society
2014 -	Research Fellow Center for Financial Studies, Sustainable Architecture for Finance in Europe (SAFE), Frankfurt
2013 -	Advisory Board Center for Applied Macroeconomic Analysis, Australian National University Canberra, Australia
2012 -	Institute New Economic Thinking, member task force systemic risk and agent-based Modeling, led by Nobel laureate Joseph Stiglitz

CITATION RECORD: SSCI: 2625+ citations; h-index = 25; top 5 papers (583, 534, 260, 101, 95)
 Google Scholar: 10000+ cit.; h-index = 41; top 5 papers (1588, 1471, 988, 362, 322)

RECENT BOOK

‘‘Behavioral Rationality and Heterogeneous Expectations in Complex Economic Systems’’, Cambridge University Press, 2013.

MAJOR INTERNATIONAL COLLABORATION

1995 - William A. Brock, heterogeneous expectations and complex economic systems, University of Wisconsin, Madison, USA

AWARDS AND GRANTS (SELECTED)

2017-2021 EU Horizon 2020 Marie Curie Int. Training Network *Expectations and Social Influence Dynamics in Economics* (ExSIDE), coord. H. Dawid, Bielefeld
 2015-2018 EU Horizon 2020, collaborative project *Bridging the gap: from Individual Behavior to the Socio-technical MaN (IBSEN)* (coord. A. Sanchez, Un. Carlos III, Madrid).
 2014-2017 EU FP7 collaborative project *Integrated Macro-Financial Modelling for Robust Policy Design* (MACFINROBODS), coordinator
 2012-2015 EU FP7 collab. project *Macro-Risk Assessment and Stabilization Policies with New Early Warning Signals* (RASTANEWS) (coord. P. Tirelli, Un. Milano-Bicocca
 2012-2014 INET-CIGI grant *Heterogeneous Expectations and Financial Crises*
 2011-2014 EU FP7 collaborative project *Complexity Models for Systemic Instabilities and Crises* (CRISIS), (coord. D. Delli-Gatti, UCSC, Milano & D. Farmer, Oxford/SFI)
 2010-2015 Complexity grant (0.5M) Dutch Science Foundation (NWO) *Understanding financial instability through complex systems* (with Dutch Central Bank)
 2008-2011 EU FP7 STREP project *Monetary and Fiscal Policy with heterogeneous agents* (POLHIA) (coordinator D. Delli-Gatti, UCSC, Milano)
 2005-2008 EU Complex Markets STREP-grant (coordinator M. Salmon, Warwick, UK)
 1998-2005 NWO-Pionier grant Cent. Nonl. Dyn. Econ. and Finance (CeNDEF), €1M

INVITED PLENARY KEY NOTE TALKS (SELECTED)

CH has given more than 250 lectures, including many invited keynote lectures at seminars, workshops and conferences, in more than 10 European countries, Australia, China and the US. Some keynote lectures are:

February 2017 *Amsterdam Lezing* about speculative bubbles in the laboratory, UvA, Amsterdam
 September 2014 European Conference Complex Systems, Lucca, Italy
 August 2013 Expectations in Dynamic Macro Models, Federal Reserve Bank San Francisco, USA
 June 2011 Alternative approaches to modeling systemic risk, ECB, Frankfurt
 March 2010 IRFMP conference, Federal Reserve Board, Washington, USA
 July 2009 Computation in Economics and Finance (CEF) conference, Sydney, Australia
 July 2007 Summerschool on Agent-based Finance, Trento, Italy (10 lectures)
 June 2005 10th annual WEHIA workshop, Essex, UK
 July 2003 SITE Summer Workshop *Computational Economics*, Stanford Univ. USA
 May 2002 VPRO-NWO Science Lecture, Paradiso, Amsterdam
 May 2000 Conference Beyond equilibrium and efficiency, Santa Fe Institute, USA

SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS

Graduate Students CH has supervised 24 PhD students since 1995 at the UvA and Tinbergen Institute

Postdoctoral Fellows CH has supervised more than 20 Postdoctoral Research Fellows at UvA funded by NWO, EU FP7 and H2020 projects and INET.

TEACHING ACTIVITIES 2015-2016

- Graduate Course *Behavioral Macroeconomics*, MPhil program Tinbergen Institute
- Graduate Course *Complexity & Behavior*, MPhil program Tinbergen Institute

EDITORIAL BOARDS

Editor *Journal of Economic Dynamics & Control* (2002-2012)
 Associate Editor *Macroeconomic Dynamics* (1997-); *Computational Economics* (1998-)
Journal of Economic Behaviour & Organization (2004-2012);
Journal of Nonlinear Science (1999-2013); *Quantitative Finance* (2000-2004)
J. of Economic Interaction and Coordination (2006-) *Complexity Economics* (2012-)
 Honorary Editor *Review of Behavioral Economics* (2014-)

PUBLICATIONS

ARTICLES IN JOURNALS

1. Anufriev, M., Hommes, C.H. and Makarewicz, T. (2018), Simple forecasting heuristics that make us smart: evidence from different market experiments, *Journal European Economic Association*, forthcoming.
2. Hommes, C.H., Lustenhouwer, J. and Mavromatis, K. (2018), Fiscal consolidations and heterogeneous expectations, *Journal of Economic Dynamics & Control* 87, 173-205.
3. Hommes, C.H. (2018), Carl's nonlinear cobweb, *Journal of Economic Dynamics & Control* 91, 7-20.
4. Diks, C.G.H., Hommes, C.H. and Wang, J. (2018), Critical slowing down as early warning signals for financial crises?, *Empirical Economics*, in press.
5. Hommes, C.H., Ochea, M. and Tuinstra, J. (2018), Evolutionary competition between adjustment processes in Cournot oligopoly: instability and complex dynamics, *Dynamic Games and Applications* 8, 822-843.
6. Bao, T., Hommes, C.H. and Makarewicz, T. (2017), Bubble formation and (in)efficient markets in learning-to-forecast and -optimize experiments, *Economic Journal* 127, F581-F609.
7. Cornea, A., Hommes, C.H. and Massaro, D. (2017), Behavioral heterogeneity in U.S. inflation dynamics, *Journal of Business & Economic Statistics*, December 2017.
8. Batista da Gama, J., Massaro, D., Bouchaud, J-P., Challet, D. and Hommes, C.H., (2017), Do agents trade too much? A laboratory experiment, *Journal of Economic Behavior & Organization* 140, 18-34.
9. Hommes, C.H., Makarewicz, T.A., Massaro, D. and Smits, T. (2017), Genetic algorithm learning in a New Keynesian macroeconomic setup, *Journal of Evolutionary Economics* 27, 1133-1155.
10. Hommes, C.H. and in't Veld, D. (2017), Behavioral heterogeneity and the financial crisis, *Journal of Economic Dynamics and Control* 80, 101-124.
11. Assenza, T., Brock, W.A., and Hommes, C.H. (2017), Animal spirits, heterogeneous expectations and the amplification and duration of crises, *Economic Inquiry* 55, 542-564.
12. Battiston, S., Farmer, J.D., Flache, A., Garlaschelli, D., Haldane, A.G., Heesterbeek, H., Hommes, C.H., Jaeger, C., May, R. & Scheffer, M. (2016), Complexity theory and financial regulation. Economic policy needs interdisciplinary network analysis and behavioral modeling, *Science* 351, 6275, 818-819.
13. Battiston, S., Farmer, J.D., Flache, A., Garlaschelli, D., Haldane, A.G., Heesterbeek, H., Hommes, C.H., Jaeger, C., May, R. & Scheffer, M. (2016), Response *Science* 352, 6283, 302.
14. Agliari, A., Hommes, C.H. and Pecora, N. (2016), Path dependent coordination of expectations in asset pricing experiments, *Journal of Economic Behavior & Organization* 121, 15-28.
15. Hommes, C.H. and Iori, G. (2015), Introduction to Special Issue on Crises & Complexity, *Journal of Economic Dynamics and Control* 50(1), 1-4.
16. Assenza, T., Grazzini, J., Hommes, C.H. and Massaro, D. (2015), P&Q strategies in monopolistic competition: some insights from the lab, *Journal of Economic Dynamics and Control* 50, 62-77.
17. Hommes, C.H. and Zhu, M. (2014), Behavioral learning equilibria, *Journal of Economic Theory* 150, 778-814.
18. Hommes, C.H. and Zeppini, P. (2014), Innovate or imitate? Behavioral technological change, *Journal of Economic Dynamics and Control* 48, 308-324.
19. Hommes, C.H. (2014), Behaviorally rational expectations and almost self-fulfilling equilibria, *Review of Behavioral Economics* 1 (inaugural issue), 75-97.
20. Bao, T., Hommes, C., and Duffy, J. (2013). Learning, Forecasting and Optimizing: an Experimental Study. *European Economic Review*, 61, 186-204.
21. Anufriev, M., Assenza, T., Hommes, C.H. and Massaro, D., (2013), Interest rate rules with heterogeneous expectations, *Macroeconomic Dynamics* 17, 1574-1604.
22. Hüsler, A., Sornette, D. and Hommes, C.H. (2013), Super-exponential bubbles in lab experiments: evidence for anchoring over-optimistic expectations on price, *Journal of Economic Behavior & Organization* 92, 304-316.
23. Hommes, C.H. (2013), Reflexivity, expectations feedback and almost self-fulfilling equilibria: economic theory, empirical evidence and laboratory experiments, special issue on Reflexivity and Economics: George Soros' Theory of Reflexivity and the Methodology of Economic Science, *Journal of Economic Methodology* 20, 406-419.
24. Hommes, C.H., Lux, T., (2013), Individual expectations and aggregate behavior in learning to forecast experiments, *Macroeconomic Dynamics* 17(2), March 2013.
25. Diks, C.G.H., Hommes, C.H. and Zeppini, P. (2013), More memory under evolutionary learning may lead to chaos, *Physica A* 392, 808-812.

26. Anufriev, M, Hommes, C.H. and Philipse, R.H.S. (2013), Evolutionary selection of expectations in positive and negative feedback markets, *Journal of Evolutionary Economics* 23, 663–688.
27. Anufriev, M. & Hommes, C.H. (2012), Evolutionary selection of individual expectations and aggregate outcomes, *American Economic Journal–Micro* 4 (4), 35-64.
28. Hommes, C.H. and Ochea, M.I. (2012), Multiple equilibria and limit cycles in evolutionary games with logit dynamics, *Games and Economic Behavior* 74, 434-441.
29. Anufriev, M. and Hommes, C.H., (2012), Evolution of market heuristics, *Knowledge Engineering Review* 27, 255-271.
30. Bao, T., Hommes, C., Sonnemans, J. & Tuinstra, J. (2012), Individual expectations, limited rationality and aggregate outcomes, *Journal of Economic Dynamics and Control* 36, 1101-1120.
31. Farmer, J.D., Gallegati, M., Hommes, C., Kirman, A., Ormerod, P., Cincotti, S., Sanchez, A. and Helbing, D. (2012), A complex systems approach to constructing better models for managing financial markets and the economy, *European Physical Journal* 214, 295-324.
32. Cincotti, S., Sornette, D., Treleven, P., Battiston, S., Caldarelli, G., Hommes, C. and Kirman, A. (2012), An economic and financial exploratory, *European Physical Journal* 214, 361-400.
33. Heemeijer, P., Hommes, C.H., Sonnemans, J. and Tuinstra, J., (2012), An experimental study on expectations and learning in overlapping generations models, *Studies in Nonlinear Dynamics & Econometrics*, 16 (4), article 2.
34. Hommes, C.H., Kiseleva, T., Kuznetsov, Y. and Verbic, M. (2012) Is memory in evolutionary selection (de) stabilizing?, *Macroeconomic Dynamics* 16, 335-357.
35. Hommes, C.H., (2011), The heterogeneous expectations hypothesis: some evidence from the lab, *Journal of Economic Dynamics and Control* 35, 1-24.
36. Hommes, C.H. and Wagener, F.O.O. (2010), Does educative stability imply evolutionary stability, *Journal of Economic Behavior & Organization* 75, 25-39.
37. Brock, W.A., Hommes, C.H. and Wagener, F.O.O., (2009), More hedging instruments may destabilize markets, *Journal of Economic Dynamics and Control* 33, 1912-1928.
38. Heemeijer, P., Hommes, C.H., Sonnemans, J., and Tuinstra, J., (2009), Price stability and volatility in markets with positive and negative expectations feedback: an experimental investigation, *Journal of Economic Dynamics and Control* 33, 1052-1072.
39. Gardini, L., Hommes, C.H., Tramontana, F. and de Vilder, R., (2009), Forward and backward dynamics in implicitly defined overlapping generations models, *Journal of Economic Behavior & Organization* 71, 110-129.
40. Diks, C.G.H., Hommes, C.H., Panchenko, V. and Weide, R. van der, (2008), E&F Chaos: a user friendly software package for nonlinear economic dynamics, *Computational Econ.* 32, 221-244.
41. Gaunersdorfer, A., Hommes, C.H. and Wagener, F.O.O., (2008), Bifurcation routes to volatility clustering under evolutionary learning, *Journal of Economic Behavior & Organization* 67, 27-47.
42. Hommes, C.H., Sonnemans, J., Tuinstra, J. and Velden, H. van de, (2008), Expectations and bubbles in asset pricing experiments, *Journal of Economic Behavior & Organization* 67, 116-133.
43. Hommes, C.H., Sonnemans, J., Tuinstra, J. and Velden, H. van de, (2007), Learning in cobweb experiments, *Macroeconomic Dynamics* 11, S1, 8-33.
44. Boswijk, H.P., Hommes, C.H., Manzan, S., (2007), Behavioral heterogeneity in stock prices, *Journal of Economic Dynamics and Control* 31, 1938-1970.
45. Brock, W.A., Dindo, P.D.E., Hommes, C.H., (2006), Adaptive rational equilibrium with forward looking agents, *International Journal of Economic Theory* 2, 241-278.
46. Hommes, C.H., and Manzan, S., (2006), Comments on "Testing for Nonlinear Structure and Chaos in Economic Time Series", *Journal of Macroeconomics* 28, 169-174.
47. Chiarella, C., He, X.Z. and Hommes, C.H. (2006), Moving average rules as a source of market instability, *Physica A: Statistical and its Applications* 370, 12-17.
48. Chiarella, C., He, X.Z. and Hommes, C.H. (2006), A Dynamic Analysis of Moving Average Rules, *Journal of Economic Dynamics and Control* 30, 1729-1753.
49. Brock, W.A., Hommes, C.H. and Wagener, F.O.O., (2005), Evolutionary dynamics in markets with many trader types, *Journal of Mathematical Economics* 41, 7-42.
50. Hommes, C.H., Sonnemans, J., Tuinstra, J. and Velden, H. van de, (2005), Coordination of expectations in asset pricing experiments, *Review of Financial Studies* 18, 955-980.
51. Hommes, C.H., Huang, H. and Wang, D. (2005), A robust rational route to randomness in a simple asset pricing model, *Journal of Economic Dynamics and Control* 29, 1043-1072.
52. Hommes, C.H., Sonnemans, J., Tuinstra, J. and Velden, H. van de, (2005), A strategy experiment in dynamic asset pricing, *Journal of Economic Dynamics and Control* 29, 823-843.

53. Sonnemans, J., Hommes, C.H., Tuinstra, J. and Velden, H. van de, (2004), The instability of a heterogeneous cobweb economy: a strategy experiment on expectation formation, *Journal of Economic Behavior and Organization* 54, 453-481.
54. Droste, E, Hommes, C.H. and Tuinstra, (2002), Endogenous fluctuations under evolutionary pressure in Cournot competition, *Games and Economic Behaviour* 40, 232-269.
55. Hommes, C.H., (2002), Modeling the stylized facts in finance through simple nonlinear adaptive systems, *Proceedings of the National Academy of Sciences (PNAS) USA*, Vol. 99, May 2002, 7221-28.
56. Hommes, C.H., (2001), Financial markets as complex adaptive evolutionary systems, *Quantitative Finance* 1, 149-167.
57. Hommes, C.H. and Rosser Jr, J.B., (2001), Consistent expectations equilibria and complex dynamics in renewable resource markets, *Macroeconomic Dynamics* 5, 180-203.
58. Dechert, W.D. and Hommes, C.H., (2000), Guest Editorial Complex nonlinear dynamics and computational methods, *Journal of Economic Dynamics & Control* 24, 651-662.
59. Goeree, J. K. and Hommes, C.H., (2000), Heterogeneous beliefs and the non-linear cobweb model, *Journal of Economic Dynamics & Control* 24, 761-798.
60. Brock, W.A. and Hommes, C.H., (1998), Heterogeneous beliefs and routes to chaos in a simple asset pricing model, *Journal of Economic Dynamics & Control* 22, 1235-74.
61. Goeree, J.K., Hommes, C.H., and Weddepohl H.N., (1998), Stability and complex dynamics in a discrete tâtonnement model, *Journal Of Economic Behaviour And Organization* 33, 395-410, REPRINTED in: J. Barkley Rosser, Jr. (Ed.), *Complexity in Economics Volume I. Methodology, interacting agents and microeconomic models*, Edward Elgar Publ. Cheltenham, Northhampton 2004, pp.390-405.
62. Hommes, C.H., (1998), On the consistency of backward looking expectations: the case of the cobweb, *Journal of Economic Behaviour And Organization* 33, 333-62.
63. Hommes, C.H. and Sorger, G., (1998), Consistent expectations equilibria, *Macroeconomic Dynamics* 2, 287-321, REPRINTED in: J. Barkley Rosser, Jr. (Ed.), *Complexity in Economics Volume I. Methodology, interacting agents and microeconomic models*, Edward Elgar Publ. Cheltenham, Northhampton 2004, pp.260-294.
64. Brock, W.A., and Hommes, C.H., (1997), A rational route to randomness, *Econometrica* 65, 1059-1095, REPRINTED in: J. Barkley Rosser, Jr. (Ed.), *Complexity in Economics Volume I. Methodology, interacting agents and microeconomic models*, Edward Elgar Publ. Cheltenham, Northhampton 2004, pp.166-202.
65. Feichtinger, G., Hommes, C.H. and Milik, A., (1997), Chaotic consumption patterns in a simple 2-D addiction model, *Economic Theory* 10, 147-173.
66. Hommes, C.H. and Eekelen, A. van, (1996), Partial equilibrium analysis in a noisy chaotic market, *Economics Letters* 53, 275-282.
67. Hommes, C.H., (1995), A reconsideration of Hicks' nonlinear trade cycle model, *Structural Change And Economic Dynamics* 6, 435-459.
68. Hommes, C.H., Nusse, H.E. and Simonovits, A., (1995), Cycles and chaos in a socialist economy, *Journal Of Economic Dynamics & Control* 19, 155-179.
69. Feichtinger, G., Herold, W., and Hommes, C.H., (1994), Chaos in a simple deterministic queuing system, *Zeitschrift für Operations Research* 40, 109-119.
70. Feichtinger, G., Hommes, C.H., and Milik, A., (1994), Complex dynamics in a threshold advertising model, *OR-Spektrum* 16, 101-111.
71. Hommes, C.H., (1994), Dynamics of the cobweb model with adaptive expectations and non-linear supply and demand, *Journal Of Economic Behaviour And Organization* 24, 315-335.
72. Hommes, C.H., (1993), Periodic, almost periodic and chaotic dynamics in Hicks' nonlinear trade cycle model *Economics Letters* 41, 391-397.
73. Hommes, C.H., (1992), Cobwebs, chaos and bifurcations, *Annals of Operations Research* 37, 97-100.
74. Hommes, C.H., (1991), Adaptive learning and roads to chaos: the case of the cobweb, *Economics Letters* 36, 127-132; REPRINTED in: W.D. Dechert (ed.) *Chaos Theory In Economics: Methods, Models And Evidence*, Edward Elgar Publ. (1996), 330-335.
75. Hommes, C.H., and Nusse, H.E., (1991), "Period three to period two" bifurcation for piecewise linear models, *Journal Of Economics* 54, 157-169.
76. Nusse, H.E. and Hommes, C.H., (1990), Resolution of chaos with application to a modified Samuelson model, *Journal Of Economic Dynamics & Control* 14, 1-19; REPRINTED in: W.D. Dechert (ed.) *Chaos Theory In Economics: Methods, Models And Evidence*, Edward Elgar Publ. (1996), 336-354.
77. Hommes, C.H., and Nusse, H.E., (1989), Does an unstable Keynesian unemployment equilibrium in a non-Walrasian dynamic macromodel imply chaos?, *Scandinavian Journal of Economics* 91, 161-167;

REPRINTED in: W.D. Dechert (ed.) *Chaos Theory In Economics: Methods, Models and Evidence*, Edward Elgar Publ. (1996), 365-373.

ARTICLES IN BOOKS

1. Hommes, C.H. and LeBaron, B. (2018), Introduction to the *Handbook of Computational Economics*, Volume 4, *Heterogeneous Agent Modeling*, Elsevier, North-Holland, Amsterdam, pp. xxi-xxix .
2. Hommes, C.H. (2017), From self-fulfilling mistakes to behavioral learning equilibria, In: Nishimura, K., Venditti, A. and Yannelis, N.C. (Eds.), *Sunspots and Non-Linear Dynamics. Essays in Honor of Jean-Michel Grandmont*. Studies in Economic Theory, Springer Verlag, Cham, pp. 97-123.
3. Assenza, T., Bao, T., Hommes, C.H. and Massaro, D. (2014), Experiments on expectations in macroeconomics and finance, In: Duffy, J. (Eds.), *Research in Experimental Economics*, Vol. 17, Emerald Press, Bingley, pp.11-70.
4. Hommes, C.H., Sorger, G. and Wagener, F.O.O. (2013), Consistency of linear forecasts in a nonlinear stochastic economy, In: Bischi, G.I., Chiarella, C. and Sushko, I. (Eds.), *Global Analysis of Dynamic Models in Economics and Finance. Essays in Honour of Laura Gardini*, Springer Verlag, Berlin, pp. 229-287.
5. Boswijk, H.P., Griffioen, G. and Hommes, C.H., (2012), Success and failure of technical analysis in the cocoa futures market, In: Kyrtsov, C and Vorlow, C. (Eds.), *Progress in Financial Markets Research*, Nova Publishers, pp.25-70.
6. Hommes, C.H. and Wagener, F.O.O., (2009), Complex evolutionary systems in behavioral finance, In: *Handbook of Financial Markets: Dynamics and Evolution*, Edited by T. Hens and K.R. Schenk-Hoppé, Elsevier – North Holland, pp.217-276.
7. Hommes, C.H., (2009), Complexity, Evolution and Learning: a simple story of heterogeneous expectations and some empirical and experimental validation, In: A. Reggiani and P. Nijkamp (Eds.), *Complexity and Spatial Networks*, Advances in Spatial Science, Springer Verlag, pp91-115.
8. Hommes, C.H., Bounded Rationality and Learning in Complex Markets, (2009), In: *Handbook of Research on Complexity*, Edited by J. Barkley Rosser, Jr., Cheltenham: Edward Elgar, pp.87-123.
9. Anufriev, M. and Hommes, C.H., (2008), Evolutionary switching between forecasting heuristics: an explanation of an asset pricing experiment, In: Schredelseker, K. and Hauser, F. (Eds.), *Complexity and Artificial Markets*, Lecture Notes in Economics and Mathematical Systems 614, Springer, pp. 41-53.
10. Hommes, C.H. (2008), Interacting Agents in Finance, entry written for the *New Palgrave Dictionary of Economics*, Second Edition, edited by L. Blume and S. Durlauf, Palgrave Macmillan.
11. Gaunersdorfer, A. and Hommes, C.H. (2007), A Nonlinear Structural Model for Volatility Clustering, In: G. Teyssi re and A. Kirman (eds.), *Long Memory in Economics*, Springer, pp265-288.
12. Hommes, C.H. (2006), Heterogeneous Agent Models In Economics and Finance, In: *Handbook of Computational Economics, Volume 2: Agent-Based Computational Economics*, Edited by L. Tesfatsion and K.L. Judd, Elsevier Science B.V., 2006, 1109-1186.
13. Hommes, C.H. (2005), Heterogeneous Agent Models: two simple examples, In: Lines, M. (Ed.), *Nonlinear Dynamical Systems in Economics*, CISM Courses and Lectures no. 476, Springer-Verlag: Vienna-New York, pp.131-164.
14. Hommes, C.H., (2005), Economic System Dynamics, In: Alwyn Scott (ed.), *Encyclopedia of Nonlinear Science*, Routledge, New York, pp. 245-248.
15. Brock, W.A. and Hommes, C.H., (2002) Heterogeneous beliefs and routes to complex dynamics in asset pricing models with price contingent contracts, In: *Equilibrium, markets and dynamics. Essays in honour of Claus Weddepohl*, Eds. Hommes, C.H., Ramer, R. and Withagen, C., Springer Verlag, Heidelberg, 2002, pp. 245-65.
16. Gaunersdorfer, A. and Hommes, C.H., (2001), Nonlinear Adaptive Beliefs and the Dynamics of Financial Markets: The Role of the Evolutionary Fitness Measure, in: G. Dorffner, H. Bischoff and K. Hornik (eds.), *Artificial Neural Networks – ICANN 2001, Lecture Notes in Computer Science 2130*, Springer-Verlag, pp.782-789.
17. Hommes, C.H., (2000), Cobweb Dynamics under Bounded Rationality, In: *Optimization, Dynamics and Economic Analysis - Essays in Honor of Gustav Feichtinger*, Dockner, E.J. et al (Eds.), Springer Verlag Berlin, 134-150.
18. Hommes, C.H., Sonnemans, J. and Velden, H. van de, (2000), Expectation Formation in a Cobweb Economy: some one Person Experiments, In: Delli Gatti, D., Gallegati, M., and Kirman, A.P. (Eds.) *Interaction and Market Structure*, Springer Verlag Berlin (2000), 253-266.

19. Brock, W.A. and Hommes, C.H., (1999), Rational Animal Spirits, In: Herings, P.J.J., Talman, A.J.J. and Laan, G. van der (Eds.), *The Theory of Markets*, North-Holland, Amsterdam, 109-137.
20. Brock, W.A., and Hommes, C.H., (1997), Models of complexity in Economics and Finance, In: Hey, C. et al. (Eds.), *System Dynamics in Economic and Financial Models*, Chapter 1, 3-41, Wiley Publishers.
21. Hommes, C.H., Strien, S. van, and Vilder, R. De, (1994), Chaotic dynamics in a 2-dimensional overlapping generations model - A numerical investigation, In: Grasman, J. and van Straten, G. (Eds.) *Predictability and Nonlinear Modelling in Natural Sciences and Economics*, Kluwer Dordrecht, 621-632.
22. Hommes, C.H., (1994), Periodic, quasi-periodic and strange, chaotic attractors in Hicks' non-linear trade cycle model, In: Grasman, J. and van Straten, G. (Eds.), *Predictability and Nonlinear Modelling in Natural Sciences and Economics*, Kluwer Dordrecht, 591-598.
23. Hommes, C.H., (1992), Periodic, quasi-periodic and chaotic dynamics in a simple macro model with Hicksian nonlinearities, In: Feichtinger, G. (Ed.) *Dynamic Economic Models and Optimal Control*, North-Holland, Amsterdam, 385-409.

BOOKS

1. Handbook of Computational Economics, Volume 4, Heterogeneous Agent Modeling, Editors Hommes, C.H. and LeBaron, B., Elsevier, North-Holland, Amsterdam, June 2018.
2. Behavioral Rationality and Heterogeneous Agents in Complex Economic Systems, Cambridge University Press, January 2013.
3. Nonlinear Economic Dynamics and Financial Modelling. Essays in Honour of Carl Chiarella, Editors: Dieci, R., He, X-Z. and Hommes, C.H., Springer Verlag, 2014.
4. Equilibrium, markets and dynamics. Essays in honour of Claus Weddepohl, Editors: Hommes, C.H., Ramer, R. and Withagen, C., Springer Verlag, Heidelberg, 2002.
5. Chaotic dynamics in economic models. Some simple case-studies, *Theses in Economics, Management & Organization*, Wolters-Noordhoff Groningen, 1991.

WORKING PAPERS

1. Bao, T., Hennequin, M., Hommes, C.H. and Massaro, D. (2016), Coordination on bubbles in large group asset pricing experiments, CeNDEF Working Paper 16-09, University of Amsterdam.
2. Arifovic, J., Hommes, C.H. and Salle, I.L., Learning to believe in simple equilibria in a complex OLG economy, CeNDEF Working Paper 16-09, University of Amsterdam.
3. Van der Leij, M., In't Veld, D. and Hommes, C.H. (2016). The formation of a core-periphery structure in heterogeneous financial networks. *DNB Working Paper 528*, Amsterdam.
4. Hommes, C.H. and Zhu, M. (2016), Behavioral learning equilibria, persistence amplification & monetary policy, CeNDEF working paper 16-03, University of Amsterdam.
5. Hommes, C.H. and Lustenhouwer, J. (2016), Managing heterogeneous and unanchored expectations: a monetary policy analysis, CeNDEF Working Paper 16-01, University of Amsterdam.
6. Hommes, C.H., Massaro, D. and Salle, I. (2015). Monetary and fiscal policy design at the zero lower bound – Evidence from the lab, CeNDEF Working Paper 15-11, University of Amsterdam.
7. Bao, T. and Hommes, C.H., (2015), When speculators meet constructors: positive and negative feedback in experimental housing markets, CeNDEF Working Paper 15-10, University of Amsterdam.
8. Hommes, C.H., Massaro, D. and Weber, M. (2015), Monetary policy under behavioral expectations: theory and experiment, Tinbergen Institute Discussion Paper TI-15-087.
9. Hommes, C.H. and Lustenhouwer, J. (2015), Inflation targeting and liquidity traps under endogenous credibility, CeNDEF Working Paper 15-03, University of Amsterdam.
10. Assenza, T., Heemeijer, P., Hommes, C.H. & Massaro, D. (2014). Managing self-organization of expectations through monetary policy: a macro experiment, CeNDEF Working Paper 014-07. Universiteit van Amsterdam.
11. Bolt, W., Demertzis, M., Diks, C., Hommes, C.H. and van der Leij, M. (2014), Identifying booms and busts in house prices under heterogeneous expectations, Working paper De Nederlandse Bank 450 and CeNDEF, University of Amsterdam.
12. Assenza, T., Heemeijer, P., Hommes, C.H. & Massaro, D. (2012). Individual expectations and aggregate macro behavior. CeNDEF Working Paper. Universiteit van Amsterdam.
13. Hommes, C.H. and de Vilder, R.G. (1995), Sunspot equilibria in an implicitly defined overlapping generations model, working paper University of Amsterdam.

PROFESSIONAL PUBLICATIONS

1. Hommes, C., Scheffer, M., Heesterbeek, H., Garlaschelli, D. and van Dalen, H., Complexe lessen voor bankiers en toezichhouders, *Me Judice*, September 2017. <http://www.mejudice.nl/artikelen/detail/complexe-lessen-voor-bankiers-en-toezichhouders>
2. Cars Hommes over gedragsmodellen, *Me Judice*, 22 December 2014, <http://www.mejudice.nl/video/detail/cars-hommes-over-gedragsmodellen>
3. The frontiers of Finance, *Interview with CeNDEF researchers Cars Hommes, Cees Diks, Jan Tuinstra, Florian Wagener en Marco van der Leij*, *International Innovation*, August 2013.
4. Hommes, C.H., Een sociaal-economische `flight simulator`, In: Geels, M. en van Opijnen, T., *Nederland in ideeën*, Maven Publishing, Amsterdam.
5. Hommes, Cars, How expectations interact to create bubbles, Interview by Perry Mehring, Institute for New Economic Thinking, Berlin, Germany, April 2012 (<http://ineteconomics.org/cars-hommes-how-expectations-interact-create-bubbles>)
6. Hommes, C.H. and Wagener, F.O.O. (2010), Gevaren van financiële vernieuwing, *ESB* 95(4594), oktober 2010, pp.601-603.
7. Hommes, C.H., (2010), The economy as a complex nonlinear system, Up close, Interview by Jona Linde, *Tinbergen Magazine* fall 2010, pp.8-12.
8. *Interview with Cars Hommes*, In: Barkley Rosser, Jr., J., Holt, R.P.F. and Colander, D. (Eds.), *European Economics at a Crossroads*, Edward Elgar, 2010, pp.82-93.
9. *Complexity*. Outline of the NWO strategic theme *Dynamics of complex systems*, as member of the NWO Complexity Program Committee, April 2008.
10. Hommes, C.H., Sonnemans, J., Tuinstra, J. and van de Velden, H., (2006), Coordination of expectations in asset pricing experiments, `papers in short` section *Tinbergen Institute Magazine* 13, Spring 2006, p.14.
11. Hommes, C.H., (2003), De pioniers van CeNDEF. Onderzoek naar niet-lineaire systemen, *AENORM* 39, mei 2003, 31-34.
12. Hommes, C.H., (2002), Onderzoek naar de psychologie van de belegger. Kudgedrag en nog veel meer, *Beurs & Financiën* 3, Januari 2002, 10-12.
13. Hommes, C.H., (2001), Economic Dynamics. From a linear, perfectly rational view towards bounded rationality, non-linearity and complex adaptive systems, *Tinbergen Magazine* 3, pp.3-7.
14. Hommes, C.H., (2000), Chaos en economie, In: *Oratiereeks*, Vossiuspers Amsterdam, REPRINTED in *Tijdschrift Politieke Economie*, 22 - no. 2, (2000), 3 –31; also REPRINTED in: *Nieuw Archief voor Wiskunde* 4, December 2000, 356-366.
15. Hommes, C.H., (2000), Grafiekstaren leidt tot heftige fluctuaties, interview In: *FEM De Week* 26, 54-56.
16. Hommes, C.H., (1995), Chaostheorie in de economie, *ESB* 80, 3993, 58-62.
17. Hommes, C.H., (1994), Deterministische chaos: grenzen aan voorspelbaarheid, *Rostra Economica*, jubileumnummer 200, 12-15.
18. Hammelberg, O.A., Hommes, C.H., and Nusse, H.E., (1992), Chaos en economie, *Economisch Magazine* (EFV Groningen) 3, 18-22.
19. Hommes, C.H., (1992), Chaotisch Prijsgedrag in een eenvoudig Economisch Model, *Wetenschappelijk Tijdschrift voor Informatica en Modelbouw* 1, 17-31

BOOK REVIEWS

1. Gjerstad, D.S. and Smith, V.L. Rethinking housing bubbles. The role of household and bank balance sheets in modeling economic cycles, Cambridge University Press, 2014. In: *Journal of Economic Psychology* 50 (2015), 138-142.
2. De Grauwe, P. and Grimaldi, M., The exchange rate in a behavioral finance framework, Princeton University Press 2006, In: *International Review of Economics and Finance* 16(2), 2007, 300-302.
3. Medio, A. and Lines, M., Nonlinear Dynamics. A primer, Cambridge University Press 2001, In: *De Economist* 152, (2004), pp. 143-145.
4. Gleick, J., Chaos. Making a new science, contribution to `Een eeuw wiskunde boeken`, in: *Nieuw Archief voor Wiskunde* 5^{de} serie, deel 1, nr. 3 (2000), 309.
5. Shone, R., Economic Dynamics: Phase diagrams and their economic application, Cambridge University Press, In: *De Economist* 147 (1999), 113-115.

6. Day, R.H., *Complex Economic Dynamics Volume I: An introduction to dynamical systems and market mechanism*, MIT Press, In: *Discrete Dynamics in Nature and Society*, Vol. 1 (1997), 177-178.
7. Medio, A., *Chaotic dynamics. Theory and applications to economics*, Cambridge University Press, In: *De Economist* 144 (4), (1996), 695-698.
8. Peters, E.E., *Chaos and order in the capital markets. A new view of cycles, prices and market volatility*, John Wiley & Sons, In: *De Economist* 141 (4), (1993), 586-588.

PHD PROJECTS

Co-advisor to the following PhD students & projects:

- 1994, Robin de Vilder, *Endogenous business cycles* (cum laude), (promotores: Jan de Gooijer and Sebastian van Strien)
- 1996, Jacob Goeree, *Applications of discrete choice models*, (cum laude), (promotor: Claus Weddepohl, copromotor Simon Anderson)

Main Advisor and **(co-)promotor** to the following PhD students & projects:

- 1999, Jan Tuinstra, (cum laude) *Dynamics of nonlinear price adjustment processes*.
- 2001, Henk vd Velden, *An experimental approach to expectation formation in dynamic econ. systems*.
- 2002, Gerwin Griffioen, *Technical analysis in financial markets*.
- 2003, Sebastiano Manzan, *Nonlinear prediction techniques in economic models and financial data*.
- 2005, Sander van der Hoog, *Microeconomic disequilibrium dynamics*.
- 2006, Valentyn Panchenko, *Nonparam. methods in economics and finance: dependence, causality and prediction*.
- 2006, Pietro Dindo, *Bounded rationality and heterogeneity in economic dynamic models*.
- 2008, Ilija Zovko (Santa Fe Institute), *Market micro structure of limit order book trading*.
- 2008, Peter Heemeijer, *Expectation formation in dynamic market models*.
- 2010, Marius Ochea, *Essays on nonlinear evolutionary game dynamics*.
- 2011, Tatiana Kiseleva, *Structural analysis of complex ecological economic optimal control problems*.
- 2011, Paolo Zeppini, *Behavioural Models of Technological Change*.
- 2012, Roy van der Weide, *The time-variation of volatility and the evolution of expectations*.
- 2012, Saeed Mohammadian Moghayer, *Bifurcations of indifference points in discrete optimal control problems*.
- 2012, Domenico Massaro (cum laude), *Bounded rationality and heterogeneous expectations in macroeconomics*.
- 2012, Te Bao, *Experiments on heterogeneous expectations and switching behavior*.
- 2013, Elenka Dugundji, *Socio-dynamic discrete choice theory and application*.
- 2014, Marcin Wolski, *Essays in nonlinear dynamics in economics and econometrics with applications to monetary policy and banking*.
- 2014, Daan in't Veld (cum laude), *Complex systems in financial economics. Applications to interbank and stock markets*.
- 2014, Michiel van de Leur, *Essays on markets over random networks and learning in continuous double auctions*.
- 2014, Tomasz Makarewicz, *Learning to Forecast: Genetic Algorithms and Experiments*.
- 2015, Dávid Kopányi, *Bounded rationality and learning in market competition*.
- 2015, Juanxi Wang, *Modelling and estimation of dynamic instability in complex economic systems*.
- 2016, Hsin-Mien Wang, *R&D, patents and innovation: a differential game approach*.
- 2017, Joep Lustenhouwer (cum laude), *Monetary & fiscal policy under bounded rationality & heterogeneous expectations*,
- 2017, Gregor Böhl, *Macrofinance dynamics, heterogeneity and policy design*.
- 2017, Moutaz Altaghlibi, *Carbon Leakage and Green Growth*.
- 2018, Aad Ruiter, *Price discovery with fallible choice*.

SEMINARS/LECTURES

Cars Hommes has given more than 250 lectures, including keynote lectures and many invited lectures, on Nonlinear Dynamics in Economics and Finance at international seminars, workshops and conferences, in more than 10 European countries, in Australia, China and in the US.

Some selected invited/keynote lectures include:

July 2017, Bank of Canada, Ottawa, Canada

February 2017, *Amsterdam Lezing* about speculative bubbles in the laboratory, UvA, Amsterdam

September 2014, European Conference Complex Systems, Lucca, Italy
 March 2013, Workshop Experimental Macroeconomics, Columbia, New York, USA
 August 2012, Expectations in Macroeconomics, Federal Reserve St. Louis, USA
 June 2011, Workshop Alternative approaches to modeling systemic risk, ECB, Frankfurt
 March 2010, A theory of heterogeneous expectations and some experimental evidence, *International Research Forum on Monetary Policy* conference, Federal Reserve Board, Washington, USA
 July 2009, A theory of heterogeneous expectations and some experimental evidence, *Conference Computational Economics and Finance*, Sydney, Australia
 July 2007, Heterogeneous expectations in economics and finance, Summerschool on Agent-based Finance, Trento, Italy (10 lectures)
 November 2006, Learning to forecast experiments with positive and negative feedback, ECB workshop, Frankfurt, Germany, November 2006.
 June 2005, Heterogeneous agents in economics and finance, invited plenary lecture, 10th annual *Workshop on Economic Heterogeneous Interacting Agents (WEHIA)*, Univ. of Essex, UK
 July 2003, E&F Chaos. A simulation package for nonlinear economic dynamics, *SITE 2003 summer workshop on Computational Methods and Applications in Economics*, Stanford, USA.
 May 2002, Helse problemen in de economie, *Paradiso Lezing*, May 26, 2002, first economist in this series of dutch scientific lectures for a general audience, organized by the K.L. Poll - Stichting voor Onderwijs, Kunst en Wetenschap, jointly with NWO and the VPRO.
 February 2001, Financial markets as nonlinear adaptive evolutionary systems, *workshop learning and model misspecification*, Federal Reserve Bank of Cleveland, Ohio, USA.
 May 2000, Evolution in financial markets, *Conference Beyond equilibrium and efficiency*, Santa Fe Institute, Santa Fe, USA.
 May 2000, Expectations in the laboratory, Opening Lecture *7th Viennese Workshop on Optimal Control Dynamic Games and Nonlinear Dynamics: Theory and Applications in Economics and OR/MS*, University of Vienna, Vienna, Austria.

OTHER SCIENTIFIC ACTIVITIES

HONORS

- Wim Duisenberg Research Fellowship, ECB, 2017/2018
- Distinguished Lorentz Fellow, Netherlands Institute of Advanced Studies, 2014/2015
- President Elect Society of Computational Economics, 2014-2016
- "ere-promotor" honorary degree William Brock, University of Amsterdam, January 8, 2009
- NWO Pionier-grant for Center for Nonlinear Dynamics in Economics and Finance (CeNDEF), 1998
- listed in 4-th edition of *Who's who in economics* (1200 best cited articles 1990-2000)

INTERNATIONAL PROGRAM COMMITTEES

- ESEM 2017, Lisbon
- CEF 2017, New York; CEF 2016, Bordeaux; CEF 2015, Taipei; CEF 2008, Paris; CEF 2006, Cyprus; CEF 2005, Washington
- NWO Complexity Program 2006-2016
- Nonlinear Economic Dynamics International Conference, Tokyo 2015; Siena 2013; Cartagena 2011
- WEHIA conference May 2003, Kiel, Germany, WEHIA 2006, Bologna, Italy.
- Viennese Workshops Optimal Control, Dynamic Games and Nonlinear Dynamics, 2003, 2000 and 1998
- CeNDEF Scientific Board, since 1998
- CEF 2004 Conference, July 2004, Amsterdam, Program Chair
- Chaos'06, IFAC CONFERENCE Analysis & Control of Chaotic Systems, Reims, France

FELLOWSHIPS

- Research Fellow Tinbergen Institute, since 1992
- NAKI-Research Fellow, since 1996-2010
- Honorary Fellow, Department of Economics, University of Wisconsin 1994, 1995, 1997

MEMBERSHIP SCIENTIFIC ORGANIZATIONS

- Econometric Society

- American Economic Association
- American Finance Association
- Society of Computational Economics
- European Mathematical Society (EMS)
- Society for Economic Dynamics and Control (SEDC),
- Wiskundig Genootschap
- Society Economic Sciences with Heterogeneous Interacting Agents (ESHIA)

ORGANIZATION

- Conference *Expectations in Dynamic Macroeconomic Models*, Dutch Central Bank, Amsterdam, September 6–8, 2016,
- 8th Amsterdam Symposium on *Behavioral and Experimental Economics (ABEE) on Large Scale Laboratory Experiments*, Amsterdam, August 29
- Tinbergen Institute Workshop *Behavioral Macroeconomics*, Amsterdam, October 26, 2015
- Lorentz Workshop *Socio-Economic Complexity*, Leiden, March 23-27, 2015
- 10th Tinbergen Institute Conference *Complexity in Economics & Finance*, May 18-20, 2015
- CeNDEF@15 Symposium, October 24-25, 2013
- Workshop *Systemic Instabilities and CRISES*, Lorentz Center Leiden, Netherlands, April 2013.
- Symposium in honour of William Brock, University of Amsterdam, January 8, 2009
- CeNDEF workshop *Complexity in Economics and Finance*, Lorentz Center, Leiden, Oct. 2007
- “Ten years of CeNDEF” workshop, January 6-7, 2009
- CeNDEF Annual Workshop on Economic Dynamics 2000, 2001, 2002.
- Lorentz Workshop *Economic Dynamics*, Lorentz Center, Leiden, June-July 2002.
- Workshop Bounded Rationality, Tinbergen Institute, Amsterdam, december 1996
- Conference *Computing in Economics and Finance (CEF)*, July 2004, Amsterdam

CONTRIBUTIONS TO THE MEDIA

- Interview by Peter de Waard “*Is Piet Paulusma de betere econoom?*”, *De Volkskrant* 23 feb. 2016.
- Interview Marten Scheffer en Cars Hommes, by Karel Berkhout, “*Als de ramp onafwendbaar wordt*”, NRC, 22 februari 2016.
- Interview by Joep Engels, *Economen moeten over hun eigen grens kijken*, *Trouw*, 19 feb. 2016.
- Video Interview over “*gedragsmodellen*”, *Me Judice*, November 2014. (<http://www.mejudice.nl/video/detail/cars-hommes-over-gedragsmodellen>)
- Interview by Martijn Calmthout, about “*50 jaar chaos theorie*”, In: *Er is geen houden aan die chaos*, *Volkskrant* 22 juni, 2013.
- Participated in TV program *Labyrint*, VPRO science program on complex systems, February 2012
- Participated in TV program *Flogiston*, VPRO science program on Chaos Theory, June 2003.
- Several Radio interviews, including *Noorderlicht*, VPRO science program, May 2002, *Madiwodo*, VPRO, November 2002, and *Wereldroep* June 1999, September 1999.
- Several interviews in journals and magazines, including *Financieel Dagblad*, August 1999 and *FEM De Week*,

POLICY

In the last 5 years CH and the CeNDEF group have worked in close cooperation with the Dutch Central Bank (DNB) on a project “*Understanding financial instability through complex systems*” through a *Complexity* grant from the Dutch Science Foundation (NWO). The purpose of this project is to do policy relevant complexity research in macro-financial systems with boundedly rational heterogeneous agents. For example, bubbles and crashes in the Dutch housing market and the housing markets of other countries (US, UK, JP, etc.) have been identified as well as policy measures that could stabilize or prevent housing bubbles. Furthermore, policy laboratory experiments have been conducted, with participation of policy makers from DNB to study the effectiveness of monetary and fiscal policies in a more realistic laboratory environment. This policy works is also discussed with other financial institutions such as the New York FRB, the Bank of England and the Bank of Canada. In a recent *Science* article, joint with Andy Haldane (Bank of England) and others, a call has been made to use complexity theory to build an policy dashboard for online monitoring of the complex financial-economic system.

TEACHING

Quantitative Methods, Mathematical Economics and Economic Theory to first year, under-graduate and graduate students of business, economics & econometrics, masters of international finance and NAKE and Tinbergen Institute graduate students.

Director of the BSc Econometrics & Operations Research and MSc Econometrics programs, at the University of Amsterdam 2004-2007.

COURSES

- Nonlinear Economic Dynamics, MSc Econometrics, University of Amsterdam, 1993-2013, 2017/2018
- Economic Theory: Bounded Rationality, for graduates in economics and econometrics, University of Amsterdam, 1993-1996
- Dynamical Systems, BSc Econometrics & OR, University of Amsterdam, 2001-2004
- Microeconomics, first year BSc Econometrics & OR, University of Amsterdam, 1997-2002.
- Mathematical Economics, BSc Econometrics & OR, University of Amsterdam, 2002-2003
- General Equilibrium Theory, MSc Econometrics, University of Amsterdam, 2002-2004
- Mathematics and Quantitative Methods for undergraduates in economics and business administration, University of Groningen, 1983-1992
- Mathematics and Quantitative Methods for undergraduates in economics and business administration, University of Amsterdam, 1992-1996
- Quantitative Methods in Economic Research, MSc Economics, University of Amsterdam, 1992-1996

ADVANCED GRADUATE COURSES:

- Complexity & Behaviour, MPhil Tinbergen Institute, 2014-2017
- Behavioural Macroeconomics, MPhil Tinbergen Institute, 2014/2017
- Nonlinear Economic Dynamics, MPhil Tinbergen Institute, 2003-2012
- Quantitative Methods for Masters of International Finance, University of Amsterdam, 1996
- Nonlinear Economic Dynamics, PhD- course, Network Quantitative Economics (NAKE) 1996, 1998, 2000, 2003.

INTERNATIONAL COURSES AND SUMMER SCHOOLS:

- PhD course *Heterogeneous Agents Models*, German Network for New Economic Dynamics (GENED), October 2016, University of Bamberg, Germany;
- Workshop *Complexity Economics and Agent-Based Simulation*, Rabat, Morocco, February 15-18, 2016 (4 lectures);
- Workshop *Complex Economic Systems in Macro & Finance*, CEF 2015, Taipei, June 19, 2015 (4 lectures)
- PhD Course *Bounded Rationality and Heterogeneous Expectations*, UCSC, Milan, September 16-17, 2013 (4 lectures).
- Workshop *Complex Economic Systems*, CEF 2013, Vancouver, July 9, 2013 (4 lectures).
- *International School on Multidisciplinary approaches to Economic and Social Complex Systems*, 28 June - 2 July, 2010, Siena, Italy (4 lectures)
- Summerschool on *Agent-based Finance*, Trento, Italy (10 lectures), July 2007.
- *Advanced School on Nonlinear Dynamical Systems and Economics*, CISM, Udine, Italy, June 2005.
- *Financial Markets as Adaptive Evolutionary Systems*, S. Anna School, Scuola Normale Superiore and University of Pisa, Italy, (8 lectures) May 2002, May 2003.