



Günter Haag

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An outstanding international and interdisciplinary career

➔ early (1980s on) and numerous traces of international encounters followed by innovative publications

- an early “grand tour” of Europe and the U.S.
- a “spatial turn” towards social sciences (regional science, geography, economics)
- 1980s a “detour” into migration modeling
- a modelling “spiral” (master equation, neural networks, AI...) for analyzing and predicting complex regional evolution

A small town in Tuscany...



San Miniato where the story starts (July 1982)



NATO summerschool organised by Dan Griffith:
« *Transformations through space and time* »



Participants (San Miniato, 1982)

(in red: future co-authors)

R.J. Bennett, **Cesare Bertuglia**, H. Bottcher, Roberto Camagni, William Clark, Leslie Curry, **Dimitrios Dendrinis**, Lidia Diappi, Dan Griffith, Günter Haag, Richard Haining, **Giorgio Leonardi**, **Silvana Lombardo**, Bernard Marchand, **Peter Nijkamp**, Silvia Occelli, Jean Paelinck, **Yorgos Papageorgiou**, **Denise Pumain**, **Giovanni Rabino**, B. Ralston, **Aura Reggiani**, **Lena Sanders**, C. Schonebeck, Eric Sheppard, **Michael Sonis**,and many others...

Presentation by **Günter Haag** « A dynamic model for the non linear migration of human population » (from the book: W. Weidlich and G. Haag: *Quantitative Sociology. Concepts and Models for the dynamics of interacting populations*. Springer series in synergetics, vol. 14, 1983.

→ A Scientific European scoop (unknown in US)



A further fruitful travel to the US

- 1983: A few months stay with Wolfgang Weidlich at Institute of Physics of the Cleveland Reserve University
- visit Yorgos Papageorgiou at Hamilton (Canada)
→ 1984 paper: G. Haag, W. Weidlich: A Stochastic Theory of Interregional Migration, *Geographical Analysis* 16, 331-357.
- visit Dimitrios Dendrinos in Kansas
→ two papers 1983 and 1984: G. Haag, D.S. Dendrinos: Toward a Stochastic Theory of Location: A Nonlinear Migration Process, *Geographical Analysis*, 15, 269-286 and D.S. Dendrinos, G. Haag: Toward a Stochastic Theory of Location: Empirical Evidence, *Geographical Analysis*, 16, 287-300.



The context: evolving paradigm for tackling territorial complexity

1 Systems analysis: **USA (MIT)** Jay Forrester 1964

General systems theory Bertalanffy 1967

→ System's autonomy / its environment

Difference equations (stock-flows accounts)

2 Self-organisation: **Europe**, Prigogine, Haken (1970-80)

→ Open systems, dissipative structures or synergetics, unpredictable effects of non linear micro-interactions on system's macro structure and dynamics, path dependence (irreversibility)

Differential equations

3 Complex systems: **Global**, ISI, Santa Fe Institute, ECSS (1990-2000)

→ Emerging properties

Agent-based models, AI (neural networks), High Performance Computing



Hanstholm (Denmark) 1985

Nato advanced Studies Institute

- Creation of an international group for the study and modelling of interregional migration including: W. Weidlich, I. Holmberg, J. Ledent, M. Munz, D. Pumain, G. Rabino, R. Rainer, N. Sarafoglou, M. Sonis.
 - 1986: kick-off meeting at Blindenmannshäusle (holidays home of Günter's parents near Stuttgart)
- = A book in 1988 Weidlich W., Haag G. (eds.):
Interregional migrations. Dynamic theory and comparative analysis, Berlin, Springer Verlag.
- ➔ First time quantitative comparison of interregional migration dynamics in 6 different countries



Models of nonlinear systems applied to interregional migrations (1985-88)

- A model rather easy to understand with a few explicit parameters (Individual transition rates and Mobility propensity)
- estimation of regional parameters from empirical observation (interregional migration flows matrices at successive time periods)
- results of simulation: regional utilities (include region size effect) and preferences (positive or negative residuals)
- a « distance » to equilibrium of migration pattern can be computed and compared between countries of different population sizes and number of regions
- Migratory preferences can then be « explained » with econometric model including other variables



Major contribution to regional science and geography

Important keywords:

Complex system (open, made of numerous interacting elements, far from equilibrium)

Non linear dynamics (stable trajectories and phase transition: more general than equilibrium economics)

Self-organization (synergetics): adjustment processes and self-reinforcement mechanisms

Precise quantitative modelling including qualitative processes (tracing back concept)



A collection of research stays all over the world

- IIASA (International Institute of Applied Systems Analysis), Laxenburg (Austria): “Long Waves in Economy”; “Metropolitan Studies” (Manfred Fischer, Michael Sonis)
- Sweden (Ake Anderson)
- Australia (David Batten)
- France (Lena Sanders and Denise Pumain)
- Italy (Giovanni Rabino, Aura Reggiani)
- The Netherlands (Peter Nijkamp)
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Further international impact

- 1992: Lena Sanders *Système de villes et synergétique*. Paris, Anthropos
- 1994 W. Brian Arthur *Increasing returns and path dependence in the economy*. University of Michigan (quotes Weidlich-Haag and Allen's work)
- 1999: Juval Portugali *Self-organization and the city*. Berlin, Springer.
- Intense participation to the ECTQG (European Colloquium on Theoretical and Quantitative Geography) (Veldhoven 85, Chantilly 89, Stockholm 91, Saint-Valéry en Caux 01...)

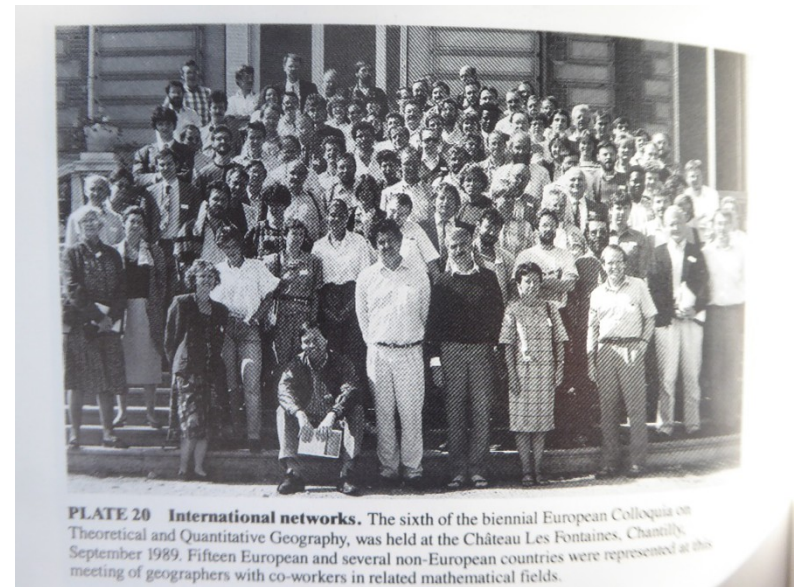
Citations of Günter Haag's books: (Google Scholar on 291 publications)

- 1988 "Interregional migration " 319 citations
- 2012 "Concepts and models of a quantitative sociology" 941 citations
- 2012 "Dynamic decision theory urban and regional topics" 137 citations
- 2017 "Modelling with the Master Equation" 40 citations

Chantilly 1989 ECTQG* where the pioneers encountered

Günter Haag, Wolfgang Weidlich (Stuttgart, Haken's group, synergetics, physics) and Peter Allen (Brussels, Prigogine's group, dissipative structures, chemistry) met for the first time, responding to a geographer's invitation

Peter Haggett
The Geographer's Art
1990, p. 112



**European Colloquium on Theoretical and Quantitative Geography*

ECTQG 1989 Chantilly



[Peter Allen, Denise Pumain, Wolfgang Weidlich]



Impact in entrepreneurship

- 1995 Günter Haag creates the Steinbeis Transfer Center for Applied System Analysis (STASA) and in 2005 STASA GmbH (regional and urban planning in Baden-Württemberg and Germany)
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- 2022 April 7-9 he co-organizes the Heilbronn conference "Urban Development, Regional Connectivity and Extended Ecosystems" (50 years Celebration of Club de Rome Limits to Growth, Meadows report)

1991



at Stuttgart University, celebration of Wolfgang Weidlich's 60th birthday with Giovanni Rabino and Günter Haag, Denise Pumain behind them.