

# **Dr. Sauro Succi: Curriculum Vitae**

# 1 Biographical data

- **1954**; Born in Forli (Italy)
- **1982**; Married to Claudia Gentile
- **1993**; Daughter Caterina

## Address

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## 2 Education

- **1987:** Ph.D. degree in Plasma Physics  
Ecole Polytechnique Federale de Lausanne (Suisse)  
Dissertation: "*Quasilinear Modelling of Lower Hybrid Current Drive and Related Problems*",
- **1980-1981:** Post-graduate school  
"Advanced Methods in Neutronics", University of Bologna, (full notes).
- **1979-80:** Military duties: Aeronautics
- **1979:** Laurea in Nuclear Engineering  
University of Bologna, Faculty of Engineering  
Thesis: "*Non-isotropy effects in the forced diffusion of charged particles in diffusive and multiplicative media*" (cum laude)
- **1973:** Scientific high-school degree  
Liceo Scientifico, F. P. De Calboli, Forli (60/60).

### 3 Professional Record

**Keywords:** *Computational and Statistical Physics, Fluid Dynamics and Material Science, Applied Math, Non-linear dynamics*

CURRENT POSITION:

**Research Director, Institute of Computing Applications, CNR,  
Rome**

CURSUS:

- **1995-: Research Director, Institute of Computing Applications, Rome**

*Employer:* National Research Council, Rome, Italy

*Position:* Research Director (Dirigente di Ricerca) in Differential Modeling and Numerical Analysis (**permanent**).

*Activity:* Scientific and financial responsibility for the research line ('Commissa'): Complex Systems in Fluid-Dynamics and Biology.

Adviser to the Director on the general management of the Institute.

- **1995: Group leader, High Performance Computing Division, ENEA, Rome**

*Employer:* Ente Nazionale Energie Alternative (ENEA)

*Position:* Group leader, High Performance Computing Division

*Activity:* Not undertaken, on account of the position above.

- **1986-95: Industry sector coordinator, IBM European Center for Scientific and Engineering Computing, Rome**

*Employer:* International Business Machines Corporation

*Position:* Industry sector coordinator, senior researcher, researcher Computational Physics/Engineering group at the IBM European Center for Scientific and Engineering Computing (ECSEC)

*Activity:* Development of computational models and algorithms for physics and engineering applications on parallel computers. Consulting to the operations of the Scientific and Technical Computing Business Unit of IBM Europe. Scientific-technical coordination of joint projects with IBM european academic and industrial partners in the field of computational physics/engineering.

- **1982-1986: PhD appointment, Ecole Polytechnique Federale Lausanne**

*Employer:* Centre de Recherches en Physique des Plasmas, Ecole Polytechnique Federale Lausanne (EPFL), Switzerland.

*Position:* Ph.D. student

*Activity:* Day-by-day use of magnetohydrodynamic stability codes for computing the stability limits of the JET (Joint European Torus) tokamak and development of mathematical and computer models for plasma heating via magnetohydrodynamic and RF waves.

- **1981-82: Fellowship holder, Max Planck Institut fuer Plasma-physik, Garching (Germany)**

*Employer:* EURATOM, Brussels

*Position:* European Fellowship holder

*Activity:* Analysis and development of mathematical models and numerical Monte Carlo algorithms for thermonuclear plasma heating via neutral beam injection.

- **1980-81: Fellowship holder, Ente Nazionale Energie Alternative**

*Employer:* Dipartimento Reattori Veloci, Ente Energie Alternative (ENEA) Bologna

*Position:* Fellowship holder

*Activity:* Analysis and development of mathematical models and numerical algorithms for the optimal control of fast breeder reactors.

## 4 Distinguished appointments

### *International*

- **2000-:** Research Associate, Lyman Lab. of Physics, *Harvard University*
- **2009-:** Guest Professor, ETH, Zuerich
- **2010:** Visiting Professor, Mathematics Department, Yale University
- **2010:** Member of the PESC Core group, European Science Foundation.
- **2009-:** Fellow of the Freiburg Institute for Advanced Studies (FRIAS), Freiburg, Germany
- **2008-:** CNR representative in the Physics and Engineering Standing Committee of the European Science Foundation
- **2008-9:** Visiting Scholar, Initiative for Innovative Computing, *Harvard University*

- **2005-8:** Visiting Senior Scientist, Mathematics Department, *Tufts University* (Boston)
- **2003:** Senior Visiting Fellow, NASA Ames Ctr for Turbulence Research, *Stanford University*
- **2002-5:** EPSRC (Engineering Physical Science Research Council) Visiting Fellow at the Queen Mary College, *London University*
- **2001-2:** Research Affiliate, Cell Biology Department, *Harvard Medical School*
- **1999-2001:** Visiting Professor at the Mathematics Department of *Yale University*,
- **1995:** Visiting Professor, Computer Science and Physics Dept., *University of Chicago*
- **1994:** Visiting Professor, Mechanics Dept., *University of Paris VI*

#### *National*

- **2001-2:** Member of the Scientific Committee of the Center for Advanced Research and Development in Sardinia (CRS4)
- **2000-:** Appointed by the Italian Ministry of Research and Research as an official referee in the area of Non-Linear and Statistical Mechanics.
- **1999:** Appointed by the Italian Ministry of University and Research as the National Delegate for the COST-P3 action: *Simulation of Physical Phenomena in Technological Applications*.

## 5 Awards/Honors/Distinctions

Dr Succi is included in the list of the Top Italian Scientists.  
([http://www.topitalianscientists.org/Top\\_italian\\_scientists\\_VIA-Academy.aspx](http://www.topitalianscientists.org/Top_italian_scientists_VIA-Academy.aspx)).

- **2012:** Raman Lecture, Indian Academy of Sciences, Bangalore
- **2012:** Alexander von Humboldt Continuation Award, Germany
- **2011:** Nominated to the **International ENI Award**
- **2011:** **Raman Chair** of the Indian Academy of Sciences
- **2011:** **Gordon-Bell Prize Honorable Mention**, with the paper "Petaflop biofluidic simulation on a two-million core system", M. Bernaschi, M. Bisson S. Melchionna, M. Matsuoka, Y. Endo and S. Succi.

- **2010: Gordon-Bell Prize finalist**, with the paper "Multiscale simulation of cardiovascular flows on the IBM BlueGene/P: full heart-circulation system at near red-blood cell resolution", A. Peters, S. Melchionna, E. Kaxiras, J. Latt, J. Sircar, M. Bernaschi, M. Bisson and S. Succi.
- **2010: Invited speaker at the Nobel Symposium 151: Water in Biology and Medicine**, Stockholm, Aug 2011.
- **2009: Invitation to contribute an article to Scholarpedia on the Lattice Boltzmann method**
- **2009: Visiting Fellowship of the Isaac Newton Institute for Mathematical Sciences**, Cambridge, UK
- **2009: Fellow of the Freiburg Institute for Advanced Studies (FRIAS)**
- **2008: The paper "Lattice Gas Dynamics with Enhanced Collisions"**, has been recognized as one of the 25 most cited papers since the birth of Europhysics Letters (1986) and included in the collection 'Most cited articles from EPL Historic Archive',  
([http://herald.iop.org/epl\\_highly\\_cited/m86/hxp/link/1978](http://herald.iop.org/epl_highly_cited/m86/hxp/link/1978)).
- **2007: Best Workshop Paper Award, 7th International Conf. on Computational Science, Beijing, May 2007**, M. Fyta, S. Melchionna, E. Kaxiras, S. Succi, 'Multiscale modeling of biopolymer translocation through a nanopore', Lecture Notes in Computational Science, 4487, 786 (2007).
- **2006: Annual Distinguished Lecture**, Center for Mathematical Modeling, University of Leicester, UK
- **2005: Killam Visiting Scholar Award**, University of Calgary, Canada
- **2002: Alexander von Humboldt Award in Physics**, Germany
- **1999: Fellow of the American Physical Society**, Division of Computational Physics),
- **1995: Window-on-Science WOS-95-2159 Award**, US Air Force Office of Scientific Research, Hanscom, USA.
- **1989-93: Three IBM certificates**, in appreciation for outstanding scientific publications.
  
- **2008: Leonardo Melandri Prize**, for distinguished citizens of the Forlì-Cesena province, who made outstanding contributions to progress in economy, culture and science

- **1997: Golden Medal award of the Pro-Forli Cultural Committee**, as a distinguished non-resident citizen.

## 5.1 Editorial offices

Associate Editor of:

- **2008-:** *Journal of Statistical Physics: Theory and Experiment*
- **2007-:** *Europhysics Letters (Statistical and non-linear physics)*
- **2005-:** *Communications in Computational Physics*
- **2005-:** *Physica A: Statistical Mechanics and its Applications*
- **1999-:** *Journal of Applied Rheology*
- **1998-:** *International Journal of Modern Physics C*
- **1996-:** *Journal of Scientific Computing*

## 6 Publications

Over 250 publications in international scientific journals and over 80 articles in refereed Proceedings, for a total of 9700+ Google Scholar cites (h=40) and 5500 ISI cites (h=36), as of January 2012.

For details see "Publication List" (also available on my www homepage).

### 6.1 Books

- **Automi Cellulari: una nuova frontiera del calcolo scientifico**, Serie Informatica Domani, Franco Angeli, (Milan), vol 5, 153 p., 1991.
- **An Introduction to Parallel Computational Fluid Dynamics**, Nova Science, (New York), 233 p., 1996.
- **The Lattice Boltzmann Equation for fluid dynamics and beyond**, Oxford Science Publications: Numerical Mathematics and Scientific Computation, Oxford University Press, 288 p., 2001. The book was positively reviewed in *Europ. J. of Mech. B: Fluids, Computers in Science and Engineering, Physics Today*. The book has been reprinted three times (2002-2004-2006) and has received nearly 2000 Google Scholar cites, as of December 2011.
- **Lattice Boltzmann Methods for complex fluid flows**, Lecture notes from the course "An Introduction to lattice Boltzmann methods for complex flow simulations", Rome, Italy, March 3-8, 2008, S. Ubertini, G. Bella, S. Succi, S. Orszag editors, Science4 Press, 2009

## 6.2 Edited Lecture Notes

- **An introduction to computational physics I: Grid methods.** Collana “Appunti”, Scuola Normale Superiore di Pisa, 102 p., 2002.
- **An introduction to computational physics II: Particle methods.** Collana “Appunti”, Scuola Normale Superiore di Pisa, 100 p., 2003.
- **Numerical methods for atomic quantum gases,** (coauthor). Collana “Appunti”, Scuola Normale Superiore di Pisa, 177 p., 2004.

## 7 Invited talks

Most of the papers listed under “Conference Proceedings” resulted from invited talks, including a number of keynotes. Besides, I delivered many seminars, keynote talks and technical presentations in most european countries, Israel, USA, Japan, China and Taiwan. Among others:

- **Academia**
  - Special Lecture, *J. Nehru Center for Advanced Scientific Research, Bangalore, India*
  - Nobel Symposium 151: Water in Biology and Medicine, Stockholm, Sweden
  - Royal Society of London, London, UK.
  - Physics Dept., *Oxford Univ.*, Oxford, UK
  - BP Institute, *Cambridge Univ.*, Cambridge, UK
  - Chemistry Dept., *Cambridge Univ.*, Cambridge, UK
  - Center for Computational Chemistry Dept., *Cambridge Univ.*, Cambridge, UK
  - Freiburg Institute for Advanced Studies, Freiburg, Germany
  - Physics Dept., *Univ. Libre Brussels*, Brussels, Belgium
  - Mechanics Dept., *Paris VI Univ.*, Paris, France
  - Physics Dept., *Scuola Normale Superiore*, Pisa, Italy
  - Center for Computational Science, *Amsterdam*, Amsterdam, Holland
  - Fluid Mechanics Dept., *EPFL Lausanne*, Lausanne, Switzerland
  - Computer Science Dept., *Geneva University*, Geneva, Switzerland
  - Material Science Dept. *ETHZ*, Zuerich, Switzerland
  - Center for Computational Science, *Queen Mary Univ.*, London, UK
  - Israel Institute of Technology, *Technion Univ.*, Haifa, Israel
  - Center for Computational Science, *Boston Univ.*, Boston, USA
  - Mathematics Department *Tufts Univ.*, Boston, USA

- Physics Dept., *Chicago Univ.*, Chicago, USA
- Mathematics Dept., *Princeton Univ.*, Princeton, USA
- Chemical Eng. Dept., *Princeton Univ.*, Princeton, USA
- Fluid Dynamics Research Ctr., *Princeton Univ.*, Princeton, USA
- Physics Dept., *Columbia Univ.*, New York, USA
- Physics Dept., *Harvard Univ.*, Cambridge, USA
- Mathematics Dept., *Yale Univ.*, New Haven, USA
- Mechanical Engineering Dept., *Calgary Univ.*, Calgary, Canada
- Nanotechnology Center, Technion Univ., Haifa, Israel
- Mechanics Dept, *Beijing Univ.*, Beijing, China
- Applied Energy Institute, Tokyo, Japan.
- Aeronautic Engineering Dept., University of Kyoto, Japan.
- Physics Department, Academia Sinica, Taiwan

- **Industry**

- *Boeing Corporation*, Seattle, USA
- *Fiat Elasis*, Pomigliano, Italy
- *Ford Motors*, Detroit, USA
- *Fuji Research*, Tokyo, Japan
- *EXA Corporation*, Boston, USA
- *General Motors*, Detroit, USA
- *IBM Research*, San Jose, USA
- *Schlumbersee Research*, Cambridge, UK
- *Shell Research*, Amsterdam, Holland
- *Enitecnologie*, Milan, Italy

- **Major keynotes and plenary lectures**

- Lattice Kinetic theory across scales: from turbulence to electron flows in graphene, *Special Lecture, J. Nehru Ctr for Advanced Scientific Research, Bangalore, India, October 2011.*
- Keynote talk on Lattice Boltzmann modeling of complex flows, *MULTIFLOW 2010, Brussels, November 2010*
- Mesoscopic models of soft-flowing materials, *Novel Simulation Approaches to Soft matter Systems, Dresden, September 2010*
- Lattice Boltzmann across scales: from turbulence to DNA translocation *Int. Workshop on the numerical treatment of soil erosion, Baeza, Spain, September 2010*

- Lattice Boltzmann modeling for quantum fluids *Center for Computational Science, Manno, Switzerland, December 2009*
- Multiscale Lattice Boltzmann Molecular Dynamics Simulations: translocation of biopolymers through nanopores *Freiburg Institute for Advanced Studies, Freiburg, November 2008.*
- Multiscale simulation of nano-biological flows, *Lorentz Center workshop on Physics of Micro and Nano-fluids, Leiden, June 2008.*
- Multiscale Lattice Boltzmann Molecular Dynamics simulations of biopolymers on the Blue-Gene supercomputer, *5th ICMES Conference, Amsterdam, June 2008.*
- Hydrokinetic approach to microfluidics, *SimBioMa Conference, Konstanz, April 2008*
- Boltzmann approach to fluid turbulence, *Solvay Workshop: A tribute to Professor Radu Balescu, Brussels, March 2008*
- Lattice Boltzmann across scales: from turbulence to DNA translocation, *23rd STATPHYS Conference, Genova, July 2007.*
- Multiscale Lattice Boltzmann Molecular Dynamics modeling of biopolymer translocation across nanopores, *Computations in Nanotechnology, Technion University, Haifa, Israel, May 2007.*
- Lattice Boltzmann across scales: from turbulence to DNA Translocation, *Leicester Distinguished Lecture, Univ. of Leicester, UK, November, 2006*
- New Frontiers of Boltzmann Kinetic Theory: from turbulence to DNA Translocation, *Killam Award Lecture, Univ. of Calgary, Canada, September 2006*
- Lattice Boltzmann Computing, *3rd Int. Conf. on Fluid Mechanics and Fluid Power, Bombay, December 2006.*
- Plenty of space in the middle: prospects of computational kinetic theory in nanoscience applications, *Synergy between Experiment and Computation in Nanoscale Science, Harvard, May 2006*
- Lattice kinetic methods for mesoscale dynamics, *MESODYN Workshop, Juelich, April 2006*
- Lattice Boltzmann Computing for Multiscale Applications, *2nd ETHZ Workshop on Multiscale Modeling, Zuerich, October 2005*
- Lattice Boltzmann for Computational Fluid Dynamics, *V Symposium on Computational Heat and Mass Transfer, Paris, May 2005.*
- Recent Advances in Lattice Boltzmann Computing, *6th Asian Conference in Computational Fluid Mechanics, Taiwan, August 2005.*
- Lattice Boltzmann for Computational Fluid Dynamics, *Third MIT Conference on Computational Fluid and Solid Mechanics, Boston, June 2005.*

- Recent Advances in lattice Boltzmann computing, *First Reality-Grid Workshop*, Royal Society , London, June 2004.
- A Boltzmann approach to Fluid Turbulence, *International Workshop on Numerical and Asymptotic Methods for Kinetic Equations*, Saarland, (Germany), April 2004.
- Mesoscopic particle methods for complex flows, *ICCS Symposium on Computational Science*, St Petersburg, (Russia), June 2003.
- Accelerated lattice Boltzmann method for steady-state flows, *11th International Conference on Fluid Dynamics and Soft Condensed Matter*, Shanghai, August 2002.
- Lattice Boltzmann methods for reactive micro-flows, *SIMU Conference on Computational Physics*, Konstanz, September 2001.
- Multiphysics applications of the Lattice Boltzmann method, *Europhysics Conference on Computational Physics, CCP01* Aachen, September 2000.
- An introduction to the lattice Boltzmann method, *China-Europe-USA Fluid Mechanics Symposium*, Beijing, August 1999,
- Elimination of fast variables via fictitious lattice dynamics, *Summer-school on "Computer simulations of rare events and the dynamics of classical and quantum condensed phase systems"*, Lerici, July 1997.
- Application of Lattice Boltzmann Methods to Fluid Dynamics, *AGARD Conference 578, Progress and Challenges in CFD Methods and Algorithms*, Sevilla, September 1996.
- Lattice Boltzmann method: a review with a glance to astrophysics, *Int. Workshop on "Cellular Automata Models: Prospects in Astrophysical Applications"*, Lieges, October 1992.
- Lattice Boltzmann Computing, *Europhysics Conference on Computational Physics*, Prague, CCP92, September, 1992.
- Lattice Boltzmann Computing, Opening speech at the *5th Symposium on Discrete Simulation of Fluid Dynamics*, Princeton, June 1992.
- Hydrodynamic behaviour of the Lattice Boltzmann Equation, *Workshop on "Numerical methods for the Simulation of Multi-Phase and Complex Flow"*, Shell Lab, Amsterdam, 1990.
- Cellular automata computing, *2st IBM Academic and Research Symposium on Large Scale Computing*, la Hulpe, Belgium, March 1988.

## 8 Didactical activity

- Courses

- Assistant to the Course of Plasma Physics I, Physics Department, *Ecole Polytechnique Federale de Lausanne*, 1984-85
- *Mathematical modeling and numerical simulation*, within the course "Istituzioni di Fisica Matematica", Math. Dept, University of Catania, October 1995
- *An Introduction to the Lattice Boltzmann Equation*, within the course "Fluidi ionizzati e gas rarefatti", Aerospace Eng. Dept, University of Rome "La Sapienza", June-July 1995.
- *An Introduction to the Lattice Boltzmann Equation*, within the course "Istituzioni di Fisica Matematica", Math. Dept., University of Parma, April 1996
- *Analisi Numerica*, Diploma in Chemical Engineering, Chem. Eng. Dept., Univ. of Rome "La Sapienza", 1996-97.
- *Analisi Numerica*, Diploma in Chemical Engineering, Chem. Eng. Dept., Univ. of Roma "La Sapienza", 1997-98.
- *Lattice Hydrodynamics*, within the course "Istituzioni di Fisica Matematica", Math. Dept., University of Parma, April 2000
- *Introduzione alla Fisica Computazionale*, Classe di Scienze Matematiche, Fisiche e Naturali, Scuola Normale di Pisa, 2000-1.
- *Complementi di Fisica Computazionale*, Classe di Scienze Matematiche, Fisiche e Naturali, Scuola Normale di Pisa, 2001-2.
- *Teoria Cinetica Computazionale dei Fluidi*, Post-graduate school of Mathematics for Industrial Applications, University of Roma, La Sapienza, 2002-3.  
item *Statistical theory of fluid turbulence*, within the course "Chemical Physics of Liquids", Scuola Normale di Pisa, a.y. 2002-3.
- *Numerical simulation of quantum gases*, within the course "Introduction to the theory of many-body systems", Scuola Normale di Pisa, a.y. 2003-4.
- *Fluid Dynamic applications of Lattice Gas Cellular Automata*, within the PhD Course in Mathematics for Industrial Technologies, Scuola Normale di Pisa, a.y. 2003-4.
- *Hydrokinetic theory*, within the PhD Course in Mathematics for Industrial Technologies, Scuola Normale di Pisa, 2004-5.
- *Numerical simulation of quantum gases*, within the course "Introduction to the theory of many-body systems", Scuola Normale di Pisa, a.y. 2004-5.
- *Numerical simulation of quantum gases*, within the course "Introduction to the theory of many-body systems", Scuola Normale di Pisa, a.y. 2005-6

- *Lattice hydrokinetic theory*, within the PhD Course in Mathematics for Industrial Technologies, Scuola Normale di Pisa, 2005-6.
- Coordinator of the course *Mathematical modelling in hydrology*, International Italian-USA degree in Hydraulic Engineering, Tuscia University, a.y. 2007-8.
- *The Lattice Boltzmann equation for fluid dynamics and beyond*, Fall Semester Course, (101-0690-011), ETH Zuerich, a.y. 2009.
- *Recent advances in Lattice Boltzmann simulation: classical, quantum and relativistic fluids*, Spring Semester Course, (101-0690-03V), ETH Zuerich, a.y. 2011.
- *Quantum relativistic kinetic theory*, Spring Semester Course, (TBD), ETH Zuerich, a.y. 2012.

• **Series of lectures**

- *Introduction to the Finite Element Method*, II International School on "Advanced Techniques in Computational Physics", International Center for Theoretical Physics, Trieste, February 1988.
- *The FORTRAN Language*, Direzione Ricerca Scientifica e Tecnologica IBM Italia, Roma, 1989.
- *Lattice Gas Hydrodynamics*, Dottorato in Ingegneria Idraulica, Università di Padova, 1989 and Genova, 1990.
- *Numerical Combustion*, as an invited professor at the Laboratoire de Modelisation en Mecanique, Université Pierre et Marie Curie, Paris, January 1994.
- *Combustion Modelling*, Course on 'Mathematical Modeling for Industrial Applications', Consorzio Archimede, University of Catania, Catania, Sept. 1994.
- *An Introduction to Parallel Computing*, as a visiting professor at the Physics and Computer Science Dept, Chicago University, August 1995.
- *The Lattice Boltzmann Equation*, Computer Science Dept, Geneva University, February 1996.
- *Lattice simulation methods*, within the course "Fisica Molecolare", Phys. Dept, Univ. of Rome "La Sapienza", May 1998.
- *Lattice Hydrodynamics*, Classe di Scienze, Scuola Normale Superiore di Pisa, January 1999.
- *Kinetic methods for fluid dynamics*, Courses for the Master degree in Computational Fluid Dynamics, University of Rome II, June 1999.
- *The Lattice Boltzmann Method*, Center for Computational Science, Amsterdam University, November 2001

- *Industrial applications of the Lattice Boltzmann Method*, Master in Computational Fluid Dynamics, Center for Advanced Studies in Sardinia, November 2002.
  - *The Lattice Boltzmann Equation*, Mechanical Eng. Dept., Calgary University, Calgary, Canada, June 2004.
  - *The Lattice Boltzmann Equation: Basic theory and selected applications*, Mathematics Department, Taiwan National University, Taipei, February 2006.
  - *Introduction to lattice kinetic methods in fluid dynamics*, Jyvaskyla University, Jyvaskyla, Finland, August 2007
  - *An introduction to lattice kinetic equations*, International School on "An Introduction to Lattice Boltzmann methods for complex flow simulations", Roma, March 2008
  - *An introduction to computational multiphysics I*, Harvard University, March 2008. The lectures are available on YouTube and iTunes.
  - *An introduction to computational multiphysics II*, Harvard University, March 2009. The lectures are available on YouTube and iTunes.
  - Lattice kinetic methods for microfluidics GASMEMS Summerschool, Bertinoro, Italy, May 2011.
  - Mesoscopic particle methods, COST Training School on Stochastic Methods in Fluid Mechanics, International Center for Mechanical sciences, Trento, Italy, July 2012,
  - Lattice Boltzmann as a tool of discovery, NORDITA, Stockholm, May 2012
  - Lattice Boltzmann for CFD Graduate School in Fluid Mechanics linked to the Excellence Centre FLOW at KTH Stockholm, September 2012,
- *Alia*
    - Co-supervisor of over 30 (master and PhD) thesis works in Mathematics, Physics and Engineering at the Universities of Rome I,II, Catania and Florence.
    - Foreign Member of 12 PhD Thesis Jury Committees in Switzerland (6), Germany (2), Finland (1), Ireland (1), Italy (1), Norway (1).
    - Qualified to apply to university professor positions in France, as per the positive pronouncement of the Evaluation Committee appointed by the French Ministry of Higher Education and Research (March 1994).

## 9 Scientific activity

My research activity is centered around the study of dynamical systems far from equilibrium, including thermonuclear plasmas, turbulent and reactive flows, quantum fluids, relativistic fluids and biological systems as well. The underlying technical thread of such a research is mathematical modeling, statistical mechanics and computer simulation.

The major highlights of my scientific activity are summarized below.

### 9.1 Plasma physics

- *Plasma-heating in nuclear fusion*

I contributed to Monte Carlo simulations of heating in fusion plasmas via injection of neutral particle beams in the diverted Tokamak reactor ASDEX ([3]).

- *Beta-limits in nuclear fusion*

I contributed to an extensive program of magneto-hydrodynamic simulations which culminated with the assessment of the maximum amount of electric current which can be supported by a Tokamak plasma as a function of the applied magnetic field (see [4]). This stability limit is nowadays regarded as one of the classical results of the nuclear fusion literature over the lasty twenty years (over 400 entries in the ISI citation list, as of December 2011).

- *Radio-frequency current drive*

In the course of my PhD work, we provided the first numerical evidence that even a small amount of radio-frequency power at the appropriate wavelength, can sustain a substantial amount of plasma current (paper [5]). The resulting computer code has been exported to the Joint European Torus, the largest nuclear fusion facility in Europe, for routinely use in support to the experimental activity ([9]).

### 9.2 Kinetic theory

- *Lattice Boltzmann method for fluid dynamics*

Together with F. Higuera (Madrid), we performed the earliest calculation ever published in a journal, proving the viability of the newborn Lattice Boltzmann method for fluid dynamics (paper [24]). Shortly after (paper [25]), together with R. Benzi, we developed a more flexible version which opened the way to fully three-dimensional, high-Reynolds number fluid dynamic simulations. More importantly, this work was the first to put forward the so-called “top-down” approach, namely the idea that efficient

mesoscopic models can be designed on the sole requirement of compliance with macroscopic dynamics, with no need of retaining inessential microdynamic constraints. This top-down approach has proved very influential for all subsequent developments in the field.

Work to enhance the theoretical span (H-theorem, nonlinear stability) and the computational power of the method (non-uniform grids, fast steady-state solvers) and to broaden its range of applications (combustion, thermo-hydrodynamics, granular flows, flows with phase-transitions, possibly even quantum physics) constituted the bulk of my research activity for the next decade.

In 2001, I published the book 'Lattice Boltzmann equation for fluid dynamics and beyond', (S. Succi, Oxford University Press, June 2001), the earliest monograph on the subject. The book is serving as a classical reference for the field, as witnessed by its substantial citation rate (nearly 2000 ISI cites as of December 2011). A similar role is played by the earliest review on the subject, Benzi-Succi-Vergassola, *Phys. Rep.* 1992, which contains many original ideas still valid to this day (the paper shows a rising citation rate, with over 700 ISI cites, as of December 2011).

- *Lattice Boltzmann for quantum mechanics and quantum field theory*

Based on the observation that the Schroedinger equation follows from Dirac's equation under the same mathematical assumptions taking the Boltzmann equation into the Navier-Stokes equations, we have developed a discrete lattice Boltzmann model for complex-valued distribution functions reproducing non-relativistic and relativistic quantum motion (papers [44, 60, 113]). The method might bear some interest as a theoretical algorithm for simulating physics on quantum computers and has been recently extended to two and three-dimensional situations ([185]), as well as to (1+1)-dimensional quantum field theory ([184]).

- *Relativistic kinetic theory*

In collaboration with the group pf Prof. Hermann at ETH Zuerich, we have developed the first relativistic version of the lattice Boltzmann equation. Applications as diverse as supernovae explosions and shock propagation in quark-gluon plasmas have been performed, highlighting the outstanding computational efficiency of the method (see *M. Mendoza et al, Phys. Rev. Lett.* 105, 014502, 2010, and *Phys. Rev. D*, 82, 105008, 2010).

### 9.3 Fluid dynamics

- *Extended self similarity in fluid turbulence*

We have argued ([46, 64]) that turbulent flows exhibit a kind of generalized self-scaling symmetry which goes beyond the classical Kolmogorov scale-invariance theory. This generalized symmetry, now known as Extended

Self-Similarity (ESS), has been explored by several experiments (among others, Ecole Normale Superieure Lyon, Rome and Yale University). ESS has established itself as a powerful data analysis tool to compute the scaling exponents of fluid turbulence (and extended non-linear systems in general) with a much better statistical accuracy than previously available.

- *Kinetic approach to turbulence modeling*

Together with Steven Orszag, Hudong Chen, and other colleagues in the USA, we have developed a new approach to turbulence modeling based on an expanded analogy between kinetic theory and fluid turbulence (see [84, 126, 137]). Although a fully fledged theory remains to be developed, this effort has already met with significant agreement with computer simulations of real-life turbulence flows. The basic ideas, as well as the accompanying numerical results, have made the object of a publication in the Science magazine ([126]).

- *Rayleigh-Benard and channel flow turbulence*

Using the Lattice Boltzmann method on massively parallel computers, we investigated the statistical properties (energy spectra, velocity and temperature probability distribution function, scaling laws) of thermal turbulence in Rayleigh-Benard cells. In particular, by means of ESS analysis, we provided evidence that thermal turbulence obeys its own scaling laws (Bolgiano scaling) quite distinct from those pertaining to isothermal turbulence (Kolmogorov scaling). See papers [46, 54]. A similar lattice Boltzmann code has been used for years on the massively parallel computer APE to perform high-resolution direct numerical simulations of channel flow turbulence (see [62, 66]). As of today, the LB method is the workhorse for computational fluid dynamics on APE, the massively parallel super-computer designed by the Italian National Institute of Nuclear Energy (Prof N. Cabibbo and G. Parisi) for Lattice Quantum Chromodynamics simulations.

- *Fluid transport in disordered media*

Together with Prof D. Rothman (MIT), we performed the earliest Lattice Boltzmann simulations of fluid flows in porous media taking into account microgeometrical details of the porous structure in three dimensions (see [26, 32]). These simulations permitted to investigate porosity regimes normally inaccessible to semi-analytical statistical models, and constitute a valuable complement/alternative to experimental data. They also pioneered the use of Lattice Boltzmann techniques in what was later to become one of its most fruitful application areas.

## 9.4 Multiscale modelling of complex flows

In the recent years, the LB method has made proof of a remarkable versatility for the description of complex material/fluid motion across scales, from

fully-developed turbulent flows in real-life complex geometries, to non-equilibrium microflows, all the way down to nanoflows of biological interest. Such remarkable versatility, configures LB not only as an efficient hydrodynamic solver, but as a fully-fledged simulational strategy, capable of providing quantitative insights into the physics of a broad class of complex systems across scales of motion. Our work in Rome has been central in demonstrating these cross-scale capabilities on quantitative grounds ( See, among others, *Sbragaglia et al, PRL 97, 204503, 2006*).

- *Multiscale hemodynamics*

In collaboration with Dr W. Miller (Berlin), we have developed mesoscopic Lattice Boltzmann (LB) models for flows with liquid-solid phase transitions ([101, 110, 145]). Together with Prof Kaxiras at Harvard, we have developed multiscale models of reactive microflows in complex geometries ([103, 105]). A general outline of multiscale applications based on the LB method is given in ([104]). More recently the Lattice-Boltzmann-Molecular-Dynamics MUPHY code, originally designed for biopolymer dynamics (see below), has been extended to the case of large-scale cardiovascular flows in anatomically realistic geometry of direct relevance to medical doctors (see [214]). This has led to the first simulation of the full heart-circulation system at near red-cell resolution. **The papers [250] and [272] have been selected as a finalists of the 2010 and 2011 editions of the Gordon Bell Prize in Supercomputing.** The latter has won an Honorable mention.

- *Micro and nano-flows*

We have formulated the first multiscale model, coupling LB with constrained molecular dynamics for *long* generic biopolymers (see M. Fyta et al, *Multiscale Modeling and Simulation*, 2006 [179]). The marriage between these two powerful methods results in a very efficient computational technique, which permits to account for hydrodynamic effects at a linear cost in the number of molecular degrees of freedom, thereby opening the way to the simulation of long molecules of biological interest. Using this new multiscale method, we have simulated a number of nano-fluidic systems of biological interest, such as biopolymer translocation across nanopores and bio-membranes ([197, 216]). *This work [183] has received the Best Paper Award at the 7th Int. Conference in Computer Simulation, Beijing, May 2007, one of the major events in computational science worldwide.* A parallel version of the code has also been developed and simulated on the massively parallel Blue-Genie supercomputer, reaching up to nearly 10 Teraflops sustained performance. Our team in Rome has also been on the forefront of the recent developments which have taken LB into the rich territory of supra-hydrodynamic, non-equilibrium flows. In particular, *Toschi-Succi, EPL, 69, 549, 2005*, provided the first evidence that LB can quantitatively reproduce the well-known Knudsen paradox, an universally agreed signature of post-hydrodynamic behaviour.

Moreover, *Sbragaglia-Succi, Phys. Fluids, 17, 093602, 2005*, developed a general analytical formulation of the appropriate kinetic boundary conditions for the LB simulation of microflows at finite-Knudsen. We have also provided quantitative evidence that the hydrokinetic Lattice Boltzmann approach correctly captures the essential features of a variety of micro-nanoflows, which do not fit the continuum hydrodynamic picture, and yet cannot be described by atomistic methods for want of computational power ([166, 174, 201, 213]).

## 9.5 Condensed matter and atomic physics

- *Bose-Einstein condensation*

I supervised the development of theoretical numerical solvers for the Gross-Pitaevski equation (GPE), a specific type of non-linear Schroedinger equation of direct relevance to the dynamics of Bose-Einstein atomic condensates in the zero-temperature limit. In particular, together with the team of Prof Tosi in Pisa, we have developed a fast explicit solver which preserves unitarity also in the presence of non-linear interactions, such as those occurring in the GPE. This method has been used in collaboration with Scuola Normale di Pisa, for the theoretical and numerical study of the ground-state and transport properties of Bose condensates in optical lattices ([89, 94, 98]).

- *Thermal excitations in quantum gases*

Besides transport properties at zero temperature, we have also developed hybrid finite-difference-Montecarlo methods to investigate the dynamics of thermal excitations of Bose-Einstein condensates and Fermi vapors at non-zero temperature ([124, 130]). Our activity in the field has been collected in a review paper in Physics Reports ([140]).

- *Analogue models of black holes*

In collaboration with Prof Tosi in Pisa, we have explored the analogies between sound propagation in BEC vortices and scattering processes from black holes. In particular, we have shown that a significant amount of energy can be extracted from rotating BEC vortices via the Penrose-Zeldovich's mechanism of superradiance ([151, 162]).

## 9.6 Theoretical biology

- *Immune system dynamics*

We have developed a scalable parallel version of the Celada-Seiden cellular automaton, one of the most realistic mathematical models of the immune system dynamics. Subsequently, we have applied some theoretical tools of statistical physics to the interpretation of the immune system response to antigen attacks (see papers [69, 85, 86]).

- *Intracellular signal transduction*

In collaboration with Prof M. Kirschner (Cell Biology, Harvard Med School) we have developed reactive cellular automata tools for the simulation of intracellular signal transduction, namely the mechanism by which extracellular signals are transported from the cell membrane to the nucleus and then converted into cellular responses ([118]).

## 9.7 High-performance computing

- *Parallel industrial fluid-dynamics*

Parallel computing has been the common thread underlying all of my activities at IBM. In particular, I took part to early application work with third-parties fluid dynamics codes using distributed memory parallel computers, from cluster of workstations up to the IBM 9076 SP2 parallel computer (see [53, 61]). This activity made the object of several international cooperations with leading european software companies, industries and research institutions (Computational Dynamics, AVL, Daimler-Benz, Meteofrance, Shell Research).

- *Massively parallel combustion*

I have been supervising PhD work at the Aerospace and Mechanical Engineering Dept. at the University of Rome for the development of numerical combustion applications on massively parallel computers.

- *Mathematical models and software tools for reactive flow analysis*

For several years at IBM ECSEC I've been coordinating the development of advanced software environments for combustion problems of direct industrial relevance. In the course of this activity, the package KIVA++ has been developed, which made the object of a few contracts with leading european industries in the automotive sector (Renault, Piaggio, Diesel Ricerche). On a more academic side, I've been developing/experimenting innovative algorithms for multiphase flows (paper [57]). In addition, together with Prof K. Molvig and coworkers, (Nucl. Eng. Dept. MIT, and EXA Corporation (Boston)) I have been developing mathematical models extending the *Digital Physics* paradigm to the case of flows with chemical reactions (see [81, 91]). Some of these models, and resulting algorithms, have been incorporated within the commercial Lattice-Boltzmann code POWERFLOW (trademark EXA Corporation), now leading the world market for aerodynamic CFD (Computational Fluid Dynamics) design.

## 10 Scientific Management

Dr Succi is currently responsible of the research line *Complex Systems in Fluid Dynamics and Biology*, within the Italian National Research Council. His major scientific management activities are listed below:

- *Class manager* of the new employees of Direzione Ricerca Scientifica e Tecnologica IBM Italia, Roma, October 89-February 90.
- *Project-leader* of joint projects with academic and industrial partners of IBM Europe in the field of computational physics/engineering. Among others:
  - *Air-Liquide*, Paris, (Material processing)
  - *Daimler-Benz*, Stuttgart, (Parallel Fluid-dynamics)
  - *Diesel Ricerche*, Trieste, (Combustion)
  - *Exa Corporation*, Boston, (Digital Combustion)
  - *Meteofrance*, Toulouse, (Parallel Meteorology)
  - *Renault*, Lyon, (Combustion, Engine Design)
  - *Shell Research*, Amsterdam, (Parallel Fluid-dynamics)
  - *Piaggio*, Pisa, (Engine Design)
- *Further industrial contacts*:
  - *Boeing-Corporation*, Seattle, (Parallel Aerodynamics)
  - *Brown-Boveri*, Zurich, (Parallel Fluid-Dynamics)
  - *ELF-Research*, Lyon, (Combustion)
  - *Ford Motors*, Detroit, (Parallel Fluid-Dynamics)
  - *General Motors*, Detroit, (Parallel Fluid-Dynamics)
  - *Rhone-Poulenc*, Paris, (Combustion)
  - *Fiat*, Pomigliano d’Arco, (Lattice Fluid Dynamics)
  - *EXA Corp.*, Lexington, Mass., USA, (Digital Physics).
- *Research contracts and grant proposals*
  - Team leader *Parallel porting of the multiscale code MUPHY to the Blue Gene parallel machine*, Harvard University, 2006
  - Consultant: *Collaborative Research: Experimental and Numerical Characterization of Thin Films in Three-Dimensional Porous Media*, National Science Foundation (Hydrologic Sciences unit), 2006
  - IAC Principal Investigator: *INFLUS, NMP-031980* (microfluidics), European Community STREP Project, 2006-9 (560 Keur). In partnership with eleven European Institutions from Academia and Industry. This task involves substantial management duties and financial responsibility towards the European Community.
  - IAC Team leader: *Re-engineering of Automotive Vehicles*, Italian Ministry of University and Research, 2006. In partnership with Rome University, FIAT Elasis and CRF Fiat (negotiation stage, as of May 2006).

- Coordinator of the Research Contract, "*Modellistica di flussi turbolenti con metodi di cinetica su reticolo Lattice Boltzmann*" ETA srl-IAC, 2005-6.
- Principal investigator: *Mathematical modelling of microreactors*, Research contract with Unilever (UK) and Numidia (ITA), 2003.
- Principal investigator: *Metodi numerici e modelli per la simulazione di flussi complessi di interesse industriale (Numerical methods for complex flows of industrial interest, (CNRC00BCBF-001)*, Istituto Applicazioni Calcolo, Univ. of Roma I, La Sapienza, University of Roma II, Tor Vergata. National Research Council Grant "Agenzia 2000", 2001.
- Project leader: *Mathematical modeling of the collective dynamics of multi-cellular biochemical systems*, Armenise-Harvard Foundation Research Grant, Cell Biology Dept., Harvard Medical School, Istituto Applicazioni Calcolo), 2001.
- Project coordinator of the NATO grant proposal "*Multiscale modelling of damaging effects from reactive microflows in disordered media*", IAC Rome, Harvard University, Russian Acad. Sciences, Krasnoyarsk, 1998, (PST.CLG.976357), 2000.
- Investigator within the grant proposal "*Kinetic theory method for Large Eddy Simulation of Turbulence*", DMS-9974289, National Science Foundation (USA), Math. Dept. Yale, IAC, 1999.
- Investigator within the European network on "*Bridging the space and time scales: a computational approach*", European Science Foundation, 1999-2003.
- Coordinator of the Research Contract "*Analisi del campo di moto dell'aria all'interno del vano motore di un autoveicolo*", Univ. Roma I,II-IAC-FIAT, 1998-2000.
- Principal investigator for the joint project "*Microscopic simulation of heterogeneous catalysis*", with Center for Non-Linear Physics, Université Libre Brussels, Belgium-Italy scientific cooperation agreement, 1997-8.
- Scientific consultant within the contract-study "*Turbulence and Combustion Modeling on Massively Parallel Machines*", ENEA- University of Rome, January 1996-98.

## 11 Other professional activities

### Referee

- *Scientific Journals*
  - Acta Applicandae Mathematicae

- Acta Materialia
- Acta Mechanica Sinica
- Zeitschrift Angewandte Mathematik und Physik
- Applied Mathematics and Computing
- Chaos
- Chemical Physics Letters
- Chemical and Engineering Science
- Computers and Fluids
- Computers in Physics
- Computer Methods in Applied Mechanics and Engineering
- Computer Physics Communications
- Discrete Applied Mathematics
- Europhysics Letters
- European Physical Journal E- Soft Matter
- Future Generation of Computer Systems
- IBM System Journal
- International Journal of Computational Fluid Dynamics
- International Journal of Computer Research
- International Journal of Modern Physics C
- International Journal of Thermal Sciences
- Journal of Biomechanics
- Journal of Chemical Physics
- Journal of Chinese Letters
- Journal of Colloid and Interface Science
- Journal of Computational Science
- Journal of Condensed Matter
- Journal of Physical Chemistry
- Journal of Computational Physics
- Journal of Computational Science
- Journal of Heat and Fluid Flow
- Journal of Fluid Mechanics
- Journal of Fluids and Structures
- Journal of Petrol and Research Engineering
- Journal of Physics A
- Journal of Scientific Computing

- Journal of Statistical Physics
  - Journal of Statistical Physics: Theory and Experiments
  - Journal of Turbulence
  - Macromolecules
  - Meccanica
  - Mechanics Research Communications
  - Molecular Physics
  - Molecular Simulation
  - Multiscale Modeling and Simulation
  - Numerical methods for partial differential equations
  - Physica A
  - Physica D
  - Physical Review Letters
  - Physical Review E (Statistical Physics)
  - Physical Review B (Condensed Matter)
  - Physics Letters A
  - Physics of Fluids
  - Physics Reports
  - Philosophical Transactions of the Royal Society, London
  - Proceedings of the National Academy of Science, USA
  - Research Letters in Physics
  - SIAM Review
  - SIAM J. of Scientific Computing
  - SIAM J. of Applied Mathematics
  - SIAM J. of Multiscale Modeling and Simulation
  - Transport in porous media
  - Transport Theory and Statistical Physics
  - Trends in Biotechnology
  - Water Resources Research
  - Zeitschrift fuer Angewandte Mathematik
- *Research Awarding and Funding Organizations*
    - Faculty Evaluator, Haverford College (USA)
    - International Center of Theoretical Physics (ICTP), Trieste
    - Deutsche Forschung Gesellschaft

- Centre Europeen de Calcul Atomique and Moleculaire (CECAM), Switzerland
  - Academy of Finland
  - Academie Wallonie-Bruxelles, Belgium
  - American University in Armenia
  - Israeli Science Foundation
  - Philip Leverhulme Prize Foundation (UK)
  - Research Council of Canada
  - Branco-Weiss Foundation, (Switzerland)
  - Josef Krainer Prize, (Austria)
  - Paul-Scherrer Institute, (Switzerland)
  - Tata Institute of Fundamental Research, (India)
  - Alexander von Humboldt Foundation, (Germany)
  - NATO Scientific Exchange Program
  - INFN (National Institute for the Physics of Matter)
  - MURST (Italian Ministry for University and Research)
  - NSF (National Science Foundation, USA)
  - ESF (European Science Foundation)
  - Hong-Kong Research Council
  - Swiss National Science Foundation, (Switzerland)
  - Dutch Basic Science Funding Program, (The Netherlands)
- *Scientific Book Publishers*
    - Springer Verlag
    - CRC Press

### **Editorial activity**

Associate Editor of:

- **2008-**: *Journal of Statistical Physics: Theory and Experiment*
- **2007-**: *Europhysics Letters (Stat. Mech. and Applied Math.*
- **2005-**: *Communications in Computational Physics*
- **2005-**: *Physica A: Statistical Mechanics and its Applications*
- **1999-**: *Journal of Applied Rheology*
- **1998-**: *International Journal of Modern Physics C*

- **1996-:** *Journal of Scientific Computing*
- Guest co-editor of the Theme issue Discrete Simulation of Fluid Dynamics: Methods, Phil. Trans. Royal Soc. A, vol. 369, n. 1944, 2011.
- Guest co-editor of the Theme issue Discrete Simulation of Fluid Dynamics: Applications, Phil. Trans. Royal Soc. A, vol. 369, n. 1945, 2011.
- Guest co-editor of the special issue of Applied Numerical Mathematics, Proceedings of DSFD2005, 14th edition of Discrete Fluid Dynamics Conference, Kyoto, 2005.
- Guest co-editor of the special issue of the Proceedings of Discrete Modelling and Simulation of Fluid Dynamics, Phil. Trans. Royal Soc. A: Math., Phys., Eng. Sciences, March 2002, following upon Europhysics Abstracts volume 25H, Discrete simulation of fluid dynamics, new trends, new perspectives, Cargese, 2001.
- Guest co-editor of the special issue of Transport Theory and Statistical Physics, vol. 23, n.1-3, 1994, Proceedings of Euromech Colloquium n.287, Discrete Models in Fluid Dynamics.

#### **Board and Committee Nominations**

- Member of the special committee on "Environmental Modelling Project", appointed by the CRS4 (Centro Ricerche Sviluppo Studi Superiori Sardegna), scientific committee, (October-December 1991) item Chairman appointed by the European Mechanic Council, of EUROMECH 287 "Discrete Models in Fluid Dynamics: theory, numerical simulation, experiment", (Cagliari, Sept. 1992)
- Chairman appointed by IBM Europe of the IBM Summer Institute on Computational Fluid Dynamics (Oberlech, August 1992)
- Member of Scientific Advisory Committee of Physics Computing '94, appointed by Computational Physics Group, European Physical Society, 1994.
- Member of Scientific Committee of the Symposium "Automi cellulari per Ricerca e Industria", Rende (Italy), September 1994.
- Member of Scientific Committee of "Discrete Models in Fluid Mechanics", Princeton, June '94.
- Member of the Scientific Board of "Consorzio Archimede", (IBM-Finisiel-Catania University), 1993-95.
- Chairman of the tutorial on "Programming Tools in High performance Computing", High Performance Computing and Networking European conference, Milan, May 1995.

- Chairman of the 'Special Technological Session' on Parallel Computing, ECCOMAS conference, Paris, Sept. '96.
- Member of Scientific Committee of the Euroconference "Microscopic approach to complexity in non-equilibrium molecular simulations", Lyon, July '96.
- Member of the National Research Council committee for national fellowship assignment, Mathematics Group, October 1996
- Member of Scientific Committee of the Symposium "Automi cellulari per Ricerca e Industria", Milan (Italy), October 1996
- Member of the National Research Council committee for international fellowship assignment, Mathematics Group, April 1997
- Member of the scientific committee of the Year Study "Mathematical Problems in Fluid Dynamics", Rome, July, 1997
- Member of the scientific committee on "Discrete simulation of Fluids", Oxford, July 98.
- Member of the european organizing committee of "ECCOMASS 98", Athens, Sept. 98,
- Member of the organizing committee of "High-Performance Computing Symp.", Boston, April 98.
- Foreign Member of the Dissertation Jury of Dr A. Kopponen Phys. Dept., University of Jyvasyla, Finland, May 98.
- Member of the organizing committee of "High-Performance Computing Symp.", San Diego, April 99.
- Member of the organizing committee of "8th International Conference on the Discrete Simulation of Fluids", Tokyo, July 1999,
- Member of the organizing committee of "High-Performance Computing Symp.", Washington D.C., April 2000.
- Member of the organizing committee of "9th International Conference on the "Discrete Simulation of Fluids", Santa Fe, August 2000.
- Foreign Member of the Dissertation Jury of Dr A. Masselot, Phys. Dept., University of Geneva, Switzerland, May 2000.
- Member of the organizing committee of "High-Performance Computing Symp.", San Diego, April 2001.
- Member of the scientific committee of the Int. Symp. "Bridging the time scales", Konstanz, September 2001.

- Chairman of the scientific committee of the "10th Conference on the Discrete Simulation of Fluids", Cargese, France, July 2001.
- Member of the scientific board of SCIRE: Scientific Consortium for Industrial Research, (FIAT Elasis-University of Rome), (2001-2)
- Member of the Scientific Committee of Center for Advanced Studies, Research and Development in Sardinia, (2001).
- Member of the National Research Council Selection Committee for the appointment of a permanent research position at Istituto Applicazioni Calcolo (2001).
- Member of the scientific committee, Picone Lectures, Roma, 2002
- Member of the organizing committee of "High-Performance Computing Symp. 2002", San Diego, April 2002.
- Member of the Jury committee of the thesis work by Dr. A. Dupuis, Computer Science Dept., Geneva University, June 2002.
- Member of the International scientific committee, 11th Conference on the Discrete Simulation of Fluids, Beirut, 2003.
- Member of the International scientific committee, Int. Conf. Comp. Sci. ICCS 2003, Minisymposium on Lattice Boltzmann methods, St Petersburg, 2003.
- Member of the International scientific committee, Conference on Computational Physics 2004, Genoa, Italy, Sept. 2004.
- Member of the international scientific committee, INFM Meeting, Genoa, Italy, June 2004.
- Member of the International scientific committee, 12th Conference on the Discrete Simulation of Fluids, Boston, 2004.
- Member of the Jury committee of the thesis work by Dr. S. Ansumali, Material Science Dept., ETHZ Zuerich, May 2004.
- Co-chairman of the minisymposium on Advances in Discrete Kinetic Theory, National Symp. of Italian Industrial and Applied Math Society, Venice, Sept. 2004.
- Co-chairman of the minisymposium on Lattice Boltzmann methods, 3rd MIT Conference on Computational Fluid and Solid Dynamics, Boston, USA, June 2005.
- Member of the international scientific committee, Int. Conf. on Comput. Heat and Mass Transfer, Paris, May 2005.

- Member of the International scientific committee, 13th Conference on the Discrete Simulation of Fluids, Kyoto, August 2005.
- Member of the International scientific committee, 14th Conference on the Discrete Simulation of Fluids, Geneva, August 2006.
- Foreign Member of the Habilitation Jury of Dr J. Harting Phys. Dept., University of Stuttgart, Germany, 1997.
- Member of the International scientific committee, 15th Conference on the Discrete Simulation of Fluids, Banff, August 2007.
- Member of the International scientific committee, Conference on Computational Physics 2007, Brussels, Belgium, Sept. 2007.
- Chairman of the European Science Foundation Workshop "Microfluidics: Theory and Experiments", Frascati, September 2007.
- Foreign Member of the Habilitation Jury of Dr J. Murphy Comp. Sci. Dept., University of Dublin, Ireland, 2008. "An Introduction to Lattice Boltzmann Methods for Complex Flow Simulations", Roma, March 2008.
- Member of the International scientific committee, 16th Conference on the Discrete Simulation of Fluids, Florianopolis, Brasil, August 2008.
- Member of the International scientific committee, 17th Conference on the Discrete Simulation of Fluids, Beijing, China, July 2009
- Member of the International scientific committee, 1st Black Forest Conference on Soft Matter Simulation, Freiburg, Germany, July 2009
- Foreign Member of the Habilitation Jury of Dr O. Malaspinas, Fluid Mech. Dept., EPFL, Switzerland, 2009.
- Chairman of the 18th Conference on the Discrete Simulation of Fluids, Roma, July 2010.
- Co-organizer of the workshop "Multiscale Fluid Dynamics with Lattice Boltzmann", Lorentz Center, Leiden University, February 2011.

## 12 Visiting activity

### Visiting scientist appointments

- Visiting professor at the Laboratoire de Modelisation en Mecanique, Universite' Pierre et Marie Curie, Paris, January '94, (Host: Prof *S. Zaleski*)
- Visiting professor at the Computer Science and Physics Depts, Chicago University, August '95 (Host: Prof *L. Kadanoff*)

- Visiting scientist at MIT Nucl. Eng. Dept and EXA Corporation, Cambridge, USA, August 1996 (Host: Prof *K. Molvig*)
- Visiting scientist at MIT Nucl. Eng. Dept and EXA Corporation, Cambridge, USA, August 1997 (Host: Prof *K. Molvig*)
- Visiting scientist at EXA Corporation, Cambridge, USA, August 1998 (Host: Dr *S. Remondi*)
- Visiting scientist at Center for Non Linear Studies, (Host: Prof *S. Chen*), Los Alamos, USA, open
- Visiting scientist at Centre Europeen Calcul Atomique and Moleculaire, (Host: Prof *M. Mareschal*, open)
- Visiting scientist at Nasa Larc Center, (Host: Dr *L. Luo*) Virginia, USA, open
- Visiting scientist at EXA Corporation, Cambridge, USA, August 2001 (Host: Dr *S. Remondi*)
- Visiting scientist at EXA Corporation, Cambridge, USA, August 2002 (Host: Dr *S. Remondi*)
- Alexander von Humboldt fellow at the Institute for Crystal Growth, Berlin, July 2003 (Host: Dr *W. Miller*)
- Alexander von Humboldt fellow at the Institute for Crystal Growth, Berlin, July 2004 (Host: Dr *W. Miller*)
- Johannes Gutenberg University, Mainz, Germany, (Host: Prof *K. Binder*)
- Computational Science Department, National Singapore University, Singapore, August 2005 (Host: Prof *T. Chu*)
- Aeronautic Engineering Department, Kyoto, August 2005 (Host: Prof *T. Inamuro*)
- Institute of Applied Physics and Computational Mathematics, Beijing, November 2007 (Host: Dr *A. Xu*)
- Freiburg Institute for Advances Studies, Freiburg, November 2008 (Host: Pr *J. Korvink*)
- Jawaharlal Nehru Center for Advanced Scientific Research, Bangalore, India, December 2010 (Host: Pr *C.N.R. Rao*)

#### **Standing invitations**

- Physics Dept, Johannes Gutenberg University, Mainz, Germany, standing invitation, (Host: Prof *K. Binder*)

- Chemistry Dept., Cambridge University, standing invitation, (Host: Prof *J.P. Hansen*)

### Short visits

- Physics Dept., UCLA(\*), June 1988, (Host: Prof. *J. Dawson*)
- Fluid Dynamics Research Center, Princeton University, June 1994, (Host: Prof *S. Orszag*)
- Hanscom US Air Force Research Center, Hanscom (Massachusetts), July 1995, (Host: Dr *J. Yepez*)
- IBM T.J. Watson Research Center, Yorktown Heights (NY), July 1996, (Host: Dr *S. Chen*)
- Fluid Dynamics Research Center, Princeton University, December 1996, (Host: Prof *S. Orszag*)
- Aerospace and Mechanical Engineering Dept., Boston University, November 1997, (Host: Prof *S. Orszag*)
- Institute of Applied Energy, Tokyo February 1998, (Host: Prof *K. Ohashi*)
- Physics Dept., Oxford University(\*), Oxford, UK, June 1998, (Host: Prof *J. Yeomans*)
- Mathematics Dept., Yale University, Yale, USA, Nov. 1998, (Host: Prof *S. Orszag*)
- Centre Europeen Calcul Atomique et Moleculaire, Lyon, December 1998, (Host Prof *M. Mareschal*)
- Classe di Scienze, Scuola Normale di Pisa, Pisa, Italy, Jan. 1999, (Host: Prof *M. Tosi*)
- Center for Computational Science, Boston University, USA, April 1999, (Host: Prof *C. Rebbi*)
- ERCOFTAG visitor, Leonard Euler Center, IMHEF, Ecole Polytech. Federale Lausanne, Lausanne, Suisse, June 1999, (Host: Prof *M. Deville*)
- Physics Department, Harvard University, Cambridge, USA, August 1999 (Host: Prof *E. Kaziras*)
- Computational Science Center, Queen Mary College, London, March 2000, (Host: Prof *P. Coveney*)
- Chemistry Department, Queen Mary College, London, May 2001, (Host: Prof *A. Shezdar*)

- Center for Computational Science, Amsterdam University, November 2001, (Host: Prof *D. Frenkel*).
- Mechanical Engineering Department, Calgary University, Calgary, June 2004 (Host: Prof *M. Mohamad*)
- Chemical Engineering Department, Princeton University, Princeton, December 2004, (Host: Prof *Y. Kevrekidis*)
- Computational Science Department, National Taiwan University, Taiwan, August 2005 (Host: Prof *J. W. Yang*)
- EXA Corporation, Physics Group, June 2006, (Host: Dr *H. Chen*)
- EXA Corporation, Physics Group, October 2007, (Host: Dr *H. Chen*)

(\* ) Not undertaken because of contingent inconveniences.

## 13 Alia

### Affiliations

- Societies
  - American Physical Society (1993-)
  - European Physical Society) (1993-2001)
  - Italian Society for Industrial and Applied Mathematics (1994-98)
  - New York Academy of Science (1998-2001)
  - Society of Industrial and Applied Mathematics (1994-98)
- Institutions
  - Physics Department, University of Rome
  - Istituto Nazionale Fisica della Materia, through the Unit of Scuola Normale di Pisa

### Foreign Languages

English (fluent)  
 French (fluent)  
 German (basic)  
 Spanish (notions)

## 14 Dr Sauro Succi: Publications

## References

- [1] G. Spiga, S. Succi, Integral Form of the Boltzmann Equation for the Forced Diffusion of Charged Particles in Anisotropically Scattering Media, *Meccanica*, 16(1981).
- [2] G. Becker, ASDEX and Neutral Injection teams, Simulation of Transport in ASDEX Divertor discharges with Neutral Injection Heating, *Nuclear Fusion*, 22,12 (1982)
- [3] S. Succi, K. Appert, A. H. Kritz and J. Vaclavik, Geometrical Effects in the Resonant Absorption of MHD Waves, *Helv. Phys. Acta*, 57,121(1984).
- [4] F. Troyon, R. Gruber, H. Saurenmann, S. Semenzato and S. Succi, MHD Limits to Plasma Confinement, 12th Meet. of the E.P.S., Aachen, Sept. 1983 and *Plasma Physics*, 26 IA, p. 209, (1984).
- [5] S. Succi, K. Appert, L. Muschietti, J. Vaclavik and J. Wersinger, On the generation of superthermal electrons in Lower-Hybrid Current Drive experiments, *Phys. Letters*, 106A, 137 (1984).
- [6] S. Succi, K. Appert, D. Moreau and J. Vaclavik, Spectra of Lower Hybrid Waves required to Sustain Significant Currents, IAEA 10th Int. Conf. on Plasma Physics and Controlled Fusion, London, Sept. 1984, *Nuclear Fusion*, vol. 1, 549,(1985).
- [7] S. Succi, K. Appert and J. Vaclavik, Generation of Superthermal Electrons Interacting with Waves in the Lower-Hybrid Range of Frequency Revisited, *Plasma Physics*, 27, 8,(1985).
- [8] G. Spiga, P. Vestrucci, S. Succi, Effects of Anisotropic Scattering on the Distribution of Charged Particles in an Electric Field, *Il Nuovo Cimento*, 85B, 2,(1985).
- [9] S. Succi, K. Appert, W. Core, H. Hamnen, T. Hellsten and J. Vaclavik, Computational Models for Wave-Particle Interaction, NUMOP (Numerical Modelling of Plasmas), Varenna, Sept. 1985 and *Comp. Phys. Comm.*, 40, 137,(1986).
- [10] K. Appert, T. Hellsten, O. Sauter, S. Succi, L. Villard and J. Vaclavik, Computing of RF Heating and Current Drive in Tokamaks, 8th European Conference on Computational Physics, Eibsee, April 1986 and *Comp. Phys. Comm.*, 43,125,(1986)
- [11] S. Succi, R. Iacono, Selfsimilar solutions of the One-Dimensional Fokker-Planck Equation,*Phys. Rev. A*, 33,4419,(1986).

- [12] K. Appert, S. Succi, L. Villard and J. Vaclavik, Finite Elements Applied to Plasma Waves, Advanced Summerschool "Finite Elements in Physics", Lausanne, September 1986, and *Computer Physics Reports* 6,(1987).
- [13] S. Succi, R. Iacono, On the Selfsimilar evolution of One-Dimensional Fokker-Planck Systems, *Phys. Rev. A*,36,5020,(1987).
- [14] S. Succi, K. Appert and J. Vaclavik, Current Generation in Fusion Plasmas by Injection of Radio-Frequency Waves: Finite Element Models on IBM 3090/VF, *Il Nuovo Cimento* 9D,5,(1987).
- [15] S. Succi, Cellular Automata Modelling on IBM 3090/VF, *Comp. Phys. Commun.*, 47,(1987).
- [16] S. Succi, Triangular versus Square Lattice Gases for the Analysis of 2D Vortex Fields, *J. of Phys. A: Math. and Gen.*,L21,(1988).
- [17] Succi, P. Santangelo and R. Benzi, High Resolution lattice gas simulations of two-dimensional turbulence, *Phys. Rev. Lett.*, 60(26),(1988)
- [18] Succi, R. Benzi and P. Santangelo, An investigation of fractal dimensions in two-dimensional lattice gas turbulence, *J. of Phys. A*, L771-776,(1988)
- [19] S. Succi, K. Appert, J. Vaclavik, G. Radicati and Y. Robert, Finite Element Models of Weak Plasma Turbulence on IBM 3090/VF, 8th Int. Conf. on Comp. Meth. in App. Sc. and Eng., Paris, Dec. 1987, *Comput. Meth. in Applied Mech. and Eng.*, 75,543,(1989).
- [20] S. Succi, D.d'Humieres and F. Szeleenyi, Lattice Gas Hydrodynamics on IBM 3090/VF, *IBM J. of Res. and Dev.*, 33,2,(1989).
- [21] G. Radicati, Y. Robert and S. Succi, Iterative algorithms for the solution of non-symmetric systems in the modelling of weak plasma turbulence, *J. of Comp. Phys.*,80,2,(1989).
- [22] S. Succi and M. Benassi, A four color parallel Gauss-Seidel algorithm for the solution of two-dimensional advection-diffusion equation with the finite element method, *J. Sc. Comp.*, Vol 4, N.1, 61, (1989)
- [23] R. Benzi and S. Succi, Bifurcations of a Cellular Automaton Fluid Under External Forcing, *J. Sta. Phys.*, 56, p.69,(1989).
- [24] F. Higuera and S. Succi, Simulating the Flow past a Cylinder with a Lattice Boltzmann Equation, *Europhys. Lett.*, 8(6), p.517, (1989).
- [25] F. Higuera, S. Succi, R. Benzi, Lattice Gas Dynamics with Enhanced Collisions, *Europhys. Lett.*, 9(4), p. 345, (1989) **Included in the collection of the 25 most cited papers since the inception of Europhysics Letters.**
- [26] S. Succi, E. Foti and F. Higuera, Simulation of Three-Dimensional Flows in Porous Media with the Lattice Boltzmann Method, *Europhys. Lett.*, 10(5),433,(1989)
- [27] M. Ottaviani, F. Romanelli, R. Benzi, M. Briscolini, P. Santangelo and S. Succi, Numerical Studies of Ion-Gradient Driven Turbulence, *Phys. Fluids B*, 2 (1), 2085, (1990).

- [28] R. Benzi and S. Succi, Two-Dimensional Turbulence with the Lattice Boltzmann Equation, *J. Phys. A: Math. and Gen.*, *23*,L1-5,(1990)
- [29] S. Succi, E. Foti, M. Gramignani, Flow through geometrically irregular media with lattice Gas automata, *Meccanica*, *25* p.253-257,(1990).
- [30] R. Benzi, M. Vergassola, S. Succi, Turbulence modeling by non-hydrodynamic variables, *Europhys. Lett.*, *13*(8) 727 (1990).
- [31] M. Vergassola, S. Succi, R. Benzi, On the hydrodynamic behaviour of the lattice Boltzmann equation, *Europhys. Lett.*, *13*(5) , p.411-416,(1990)
- [32] A. Cancelliere, C. Chang, E. Foti, S. Succi, D. Rothman, The permeability of a random medium; comparison of simulation with theory, *Phys. Fluids A*, *2* (12) 2085 (1990).
- [33] S. Succi, R. Benzi and F. Higuera, The Lattice Boltzmann Equation: a new tool for computational fluid dynamics, Proc. of the Workshop on "Lattice Gas Methods for Partial Differential Equations", Los Alamos, Sept. 1989, *Physica D*, *47*,219,(1991)
- [34] M. Bernaschi, E. Marinari, S. Patarnello and S. Succi, Three-dimensional Visualization of many-body system dynamics, *IBM J. of Res. and Dev.*, vol. *35*, No 1/2 (1991).
- [35] S. Succi, R. Benzi, M. Vergassola, Lattice Boltzmann scheme for two-dimensional Magnetohydrodynamics, *Phys. Rev. A* *4*, p.4521 (1991).
- [36] R. Benzi, S. Succi e M. Vergassola, The Lattice Boltzmann Equation for Turbulence *Nuclear Phys. B (Proc. Supp.)*, *17*,708,(1990). *Phys. Rev. A*, *43*, 4521(1991) .
- [37] R. Benzi, S. Succi and M. Vergassola, The lattice Boltzmann equation: theory and applications, *Physics Reports*, vol.222,n.3, p.145, (1992).
- [38] F. Nannelli and S. Succi, The Finite Volume Lattice Boltzmann Equation, Advanced Research Workshop on Lattice Gas Automata, Nice, June '91, *J. Sta. Phys.*, *68*(3/4), p. 401, (1992).
- [39] A. Cali, S. Succi, A. Cancelliere, R. Benzi, M. Gramignani, Diffusion and Hydrodynamic Dispersion with the Lattice Boltzmann Method, *Phys. Rev. A*, *15*(4) (1992).
- [40] F. Papetti, S. Golini, M. Maggiore, P. Gaillard, J. Perez and S. Succi, Numerical Combustion in an Advanced Computing Environment, *IBM System Journal*, *31* (4) (1992).
- [41] J. Weimar, D. Dab, J.P. Boon and S. Succi, Fluctuation Correlations in Reaction-Diffusion Systems; Reactive Lattice Gas Automata Approach, *Europhys. Lett.*, *20* (7) 627 (1992).
- [42] G. Betello, G. Richelli, F. Ruello, Succi S., Lattice Boltzmann Method on a cluster of IBM RISC System/6000 workstations, Proceedings of the 1st Symp. on "High Performance Distributed Computing", Ithaca September 1992, and *Concurrency: Practice and Experience*", *5*(4) 359 (1993).
- [43] S. Succi, G. Betello, G. Richelli, F. Ruello, Lattice Boltzmann Method on a cluster of IBM RISC System/6000 workstations, Proc. of the 18rd Conf. on "Rarefied Gas Dynamics" Vancouver, August 1992, *Progress in Aeronautics and Astronautics*, *159*, 409, (1993).

- [44] S. Succi, R. Benzi, Lattice Boltzmann Equation for Quantum Mechanics, *Physica D*, 69 3-4, 327, (1993).
- [45] R. Benzi, S. Ciliberto, R. Tripicciono, F. Baudet, F. Massaioli and S. Succi, Extended self-similarity in turbulent flows, *Phys. Rev. E, Rap. Comm.* 48(1), R29, (1993).
- [46] F. Massaioli, R. Benzi and S. Succi, Exponential tails in Rayleigh-Benard convection, *Europhys. Lett.* 21(3),305, (1993).
- [47] S. Succi, R. Benzi, F. Massaioli, A review of the Lattice Boltzmann Method, *Int. J. of Modern Physics C*, 4(2) (1993).
- [48] S. Succi, D. d'Humieres, Y.H. Qian, S. Orszag, On the near-subgrid behaviour of Lattice BGK and Lattice Boltzmann schemes, *J. Sc. Comp.*, vol. 8 n.3, (1993).
- [49] G. Chiatti, S. Golini, M. Maggiore, F. Papetti, S. Succi, Improving the KIVA-II vaporization model on an advanced computing environment, *Comp. Fluid Dynamics Journal*, 2,(1) (1993).
- [50] S. Succi, F. Nannelli, The finite-volume formulation of the Lattice Boltzmann equation, *Transp. Theory and Statistical Physics*, 23(1-3) 167 (1994).
- [51] M. Briscolini, R. Benzi, P. Santangelo, S. Succi, Extended Self Similarity in three-dimensional homogeneous turbulence, *Phys. Rev. E, Rapid Comm.*, 50(3), R1745, (1994).
- [52] P. Falsaperla, S. Motta, S. Succi, Parallel Efficiency of the CRF method on a IBM RS/6000 cluster platform, *J. Scient. Comp.*, Vol. 9, N.3, 293, (1994).
- [53] G. Punzo, F. Massaioli, S. Succi, High-resolution Lattice Boltzmann Computing on the IBM SP1, *Computers in Physics*, vol.8, n.6, (1994).
- [54] R. Benzi, S. Ciliberto, F. Massaioli, R. Tripicciono, S. Succi, On the scaling of velocity and temperature structure functions in Rayleigh-Benard convection, *Europhysics Letters*, 25(5), p.34, (1994).
- [55] F. Massaioli, R. Benzi, F. Tripicciono and S. Succi, Temperature Pdf's in Rayleigh-Benard convection, *Europ. J. of Fluid Mech.*, vol.14, n.1, (1995).
- [56] Y. Qian, S. Succi, and S. Orszag, Recent advances in Lattice Boltzmann computing, *Annual Review of Comput. Phys.*, vol. 3, p.195, (1995).
- [57] S. Zaleski, J. Li and S. Succi, Full Navier-Stokes simulation of liquid droplet deformation and breakup, *Phys. Rev. Lett.* 1995, vol. 75, n.2, p.244, (1995).
- [58] R. Benzi, S. Ciliberto, R. Tripicciono, F. Baudet, F. Massaioli and S. Succi, Reply to "Comment on Extended self-similarity in turbulent flows", *Phys. Rev. E, Comments* 51(3), 2672, (1995).
- [59] S. Succi, G. Amati, R. Benzi, Challenges in lattice Boltzmann computing, *J. Sta. Phys.*, vol. 81, 1/2, p. 5, (1995).
- [60] S. Succi, Numerical solution of the Schroedinger equation using Discrete Kinetic Theory, *Phys. Rev. E*, 53,2, 1969, (1996)
- [61] M. Bernaschi, F. Papetti, S. Succi., G. Bachler, R. Greimel, Parallel combustion on a scalable parallel platform, *SIAM Column*, 16, June 1996.

- [62] G. Amati, S. Succi, R. Benzi, Turbulent channel flow simulations with a coarse-grained extension of the lattice Boltzmann method, *Fluid Dyn. Res.* 19, p. 289-302, (1997).
- [63] S. Succi, G. Bella, F. Papetti, Lattice Kinetic theory for numerical combustion, *J. Scient. Computing*, vol.12, n.4, p.395, (1997).
- [64] G. Amati, R. Benzi, S. Succi, Extended self similarity in boundary layer turbulence, *Phys. Rev. E*, vol. 55, 6, p.6985 (1997).
- [65] S. Succi, J. Wang, Y. Qian, Clustering instability in granular gases, *Int. J. Mod. Phys. C*, vol. 8 (4), p. 999, (1997).
- [66] G. Amati, S. Succi, R. Piva, Massively parallel lattice Boltzmann simulations of turbulent channel flow, *Int. J. Mod. Phys. C*, vol. 8 (4), p. 869, (1997).
- [67] S. Succi, Lattice Boltzmann Equation: Failure or Success?, *Physica A*, vol. 240,1-2,p.221, (1997)
- [68] M. Bernaschi, F. Castiglione, S. Succi, Simulating the immune response on a distributed memory parallel computer, *Int. J. Mod. Phys. C*, vol.8 (4), p.569, (1997)
- [69] S. Succi, M. Bernaschi, F. Castiglione, Entropy gain in the immune system response, *Phys. Rev. Lett.*, 79,22,p.4493 (1997).
- [70] G. Bella, M. Presti, S. Succi, Lattice BGK simulations of catalytic conversion, *Society Automotive Engineers paper n. 972907*, p.1,(1997).
- [71] A. Renda, S. Succi, G. Bella, I. Karlin, Thermohydrodynamic lattice BGK schemes with non-perturbative equilibria, *Europhys. Lett.* 41, 3, p.279, (1998).
- [72] I. Karlin, N. Gorban, S. Succi, V. Boffi, Exact equilibria for lattice kinetic equations, *Phys. Rev. Lett.* 81-1, p.6, (1998).
- [73] S. Succi, H. Chen, I. Karlin, Internal symmetries of lattice kinetic equations, *J. Phys. IV France*, 8, 271, (1998)
- [74] I. Karlin, S. Succi, Equilibria for discrete kinetic equations, *Phys. Rev. E*, *Rap. Comm.* 58, R4053, (1998).
- [75] S. Succi, P. Vergari, A Lattice Boltzmann scheme for semiconductor dynamics, *VLSI Design*, (1-4), p. 137, (1998).
- [76] S. Succi, Lattice quantum mechanics: an application to Bose-Einstein condensation, *Int. J. Mod. Phys. C*, 9(8), p. 1577, (1998),
- [77] G. De Fabritiis, A. Mancini, D. Mansutti, S. Succi, Mesoscopic models for melting/solidification processes, *Int. J. Mod. Phys. C*, 9(8), p.1405, (1998)
- [78] S. Succi, G. Amati, R. Piva, Unified lattice Boltzmann schemes for turbulence and combustion, *Zeit. Angew. Mathem. und Mech.*, 78, suppl.(1), p.129, (1998)
- [79] S. Succi, M. De Cicco, G. Bella, Nonlinear stability of compressible thermal lattice BGK models *SIAM J. Scient. Comput.*, vol.1 (1), p.366 (1999)

- [80] G. Amati, S. Succi, R. Piva, Preliminary evaluation of scaling exponents in channel flow turbulence, *Fluid Dyn. Res.* 24(4), p.201, (1999)
- [81] S. Succi, H. Chen, C. Teixeira, G. Bella, A. De Maio, K. Molvig, An integer realization of the Lax scheme for the transport of multiple components, *J. Comp. Phys.* 152, p.493, (1999).
- [82] F. Toschi, R. Benzi, L. Biferale, S. Succi, Intermittency of shell models with eddy viscosity, *Phys. Fluids*, 11(5), p. 1221, (1999).
- [83] I. Karlin, S. Succi, S. Orszag, Lattice Boltzmann formulation in irregular grids, *Phys. Rev. Lett.*, 82,26, p. 5245, (1999).
- [84] H. Chen, S. Succi, S. Orszag, Analysis of subgrid scale turbulence using the Boltzmann BGK kinetic equation, *Phys. Rev. E, Rap. Comm.*, 59(3), R2527, (1999).
- [85] M. Bernaschi, F. Castiglione, S. Succi, High performance simulator of the immune system response, *Future Generation Computer System Journal*, 15, 333, (1999).
- [86] M. Bernaschi, F. Castiglione, P. Seiden, S. Succi, Learning cascade in the immune system dynamics: a numerical simulation *Comp. Phys. Comm.*, 121, 122, (1999).
- [87] M. Bernaschi, G. Bella, S. Succi, H. Chen, Digital physics simulations of reactive flow in a catalytic converter, *J. Sc. Comp.* 14(3), p. 211, (1999).
- [88] I. Karlin, S. Succi, On the H-theorem in lattice kinetic theory, *Rivista Matematica Universita' di Parma*, Centennial issue, vol. 6(2), p. 143, (1999).
- [89] M. Chiofalo, S. Succi, M. Tosi, Output coupling of Bose condensates from atomic tunnel arrays: a numerical study, *Phys. Lett. A* 260, 86, (1999).
- [90] F. Toschi, G. Amati, S. Succi, R. Benzi and R. Piva, Intermittency and structure functions in channel flow turbulence, *Phys. Rev. Lett.* 82(25), p. 5044, (1999).
- [91] M. Adamo, M. Bernaschi, G. Bella, S. Succi, Multi-representation techniques for multiscale problems, *Molecular Simulation*, 25, 1-2, p.13, (2000).
- [92] M. Bernaschi, F. Castiglione, S. Succi, Large scale cellular automata simulation of the Immune System response, *Phys. Rev. E*, 61(2), p. 1851, (2000).
- [93] M. Cerimele, M. Chiofalo, F. Pistella, S. Succi and M. Tosi, Explicit scheme for the numerical solution of the Gross-Pitaeski equation: an application to Bose-Einstein condensation, *Phys. Rev. E*, 62(1), p.1382, (2000),
- [94] F. Mazzocco, W. Arrighetti, G. Bella, S. Succi, An application of multiscale Lattice Boltzmann methods to turbine flow calculations, *Int. J. Mod. Phys. C*, vol. 11, 2, 233, (2000),
- [95] M. Cerimele, F. Pistella, S. Succi, Particle-like scheme for the Gross-Pitaeski equation: an application to Bose-Einstein condensation, *Comp. Phys. Comm.*, 129, p.82, (2000).
- [96] S. Succi, I. Karlin, H. Chen and S. Orszag, Exact resummation techniques in the kinetic approach to subgrid turbulence modeling, *Physica A*, 280, p. 92, (2000).

- [97] P. Ilg, I. Karlin, S. Succi, Supersymmetric solution of the FENE-P dumbbell model, *Europhys. Lett.* 51(3), p.355, (2000).
- [98] M. L. Chiofalo, S. Succi, M. P. Tosi, Ground-state of trapped interacting Bose-Einstein condensates by an explicit imaginary-time algorithm, *Phys. Rev. E*, 62(5), p.7438, (2000).
- [99] M. Bernaschi, S. Succi, H. Chen, Accelerated Lattice Boltzmann method for steady-state flow simulations, *J. Scient. Computing*, 16(2), p. 135, (2001).
- [100] O. Filippova, F. Mazzocco, S. Succi, C. Arrighetti, G. Bella, Multiscale Lattice Boltzmann with turbulence modeling, *J. Comp. Phys.* 170(2), p. 812, (2001).
- [101] W. Miller, S. Succi, D. Mansutti, A mesoscopic Lattice Boltzmann model for melting and solidification, *Phys. Rev. Lett.*, 86(16), p.3578, (2001).
- [102] M. L. Chiofalo, S. Succi, M. P. Tosi, Probing the energy bands of a Bose-Einstein condensate in an optical lattice, *Phys. Rev. A*, 6306(6), p.3613, (2001).
- [103] S. Succi, G. Smith, A. Gabrielli, E. Kaxiras, Chemical efficiency of reactive microflows with heterogeneous catalysis: a lattice Boltzmann study, *Europhys. J.: Appl. Phys.* 16(1), p.71, (2001).
- [104] S. Succi, O. Filippova, G. Smith, E. Kaxiras, Applying the Lattice Boltzmann equation to multiscale fluid problems, *Computing in Science and Engineering*, 3(6), p.26, (2001).
- [105] S. Succi, G. Smith, E. Kaxiras, Lattice Boltzmann simulation of reactive microflows over catalytic surfaces, *J. Stat. Phys.*, 107(1-2), p. 343, (2002).
- [106] P. Ilg, A. De Angelis, C. Casciola, I. Karlin and S. Succi, Polymer dynamics in wall turbulent flow, *Europhys. Lett.*, 58(4), p. 616, (2002)
- [107] S. Succi, O. Filippova, H. Chen, S. Orszag, Towards a renormalized Lattice Boltzmann equation for fluid turbulence, *J. Stat. Phys.*, 107(1-2), p. 261, (2002).
- [108] G. De Fabritiis, S. Succi, P. Coveney, Electronic structure calculations using self-adaptive multiscale Voronoi basis functions, *J. Stat. Phys.*, 107(1-2), p. 159, (2002).
- [109] S. Succi, Lattice Boltzmann schemes for quantum applications, *Comp. Phys. Comm.* 146(3) p. 317, (2002).
- [110] W. Miller, S. Succi, A Lattice Boltzmann model for anisotropic crystal growth from melt, *J. Stat. Phys.*, 107(1-2), p. 173, (2002).
- [111] S. Succi, I. Karlin, H. Chen, Role of the H-theorem in Lattice Boltzmann hydrodynamic simulations, *Review of Modern Physics Colloquia* 74(4), p.1203, (2002).
- [112] A. Gabrielli, S. Succi, E. Kaxiras, Lattice Boltzmann study of reactive microflows *Comp. Phys. Comm.*, 147, p. 516, (2002)
- [113] S. Succi, Lattice Boltzmann equation for relativistic quantum mechanics, *Phil. Trans. Royal Soc. Lond. A:* 360(1792), p. 429, (2002).

- [114] M. Bernaschi, S. Succi, H. Chen, R. Zhang, Computing steady-state flows with an Accelerated Lattice Boltzmann scheme, *Int. J. Mod. Phys. C*, 13(5), p. 675 (2002).
- [115] S. Succi, Book Review: an introduction to chaos in non-equilibrium statistical mechanics (by J.R. Dorfman) *SIAM Review*, in press.
- [116] M. Pilotti, S. Succi, Energy dissipation and permeability in porous media, *Europhys. Lett.* 60(1), p. 72, (2002)
- [117] S. Succi, Mesoscopic modelling of slip motion at fluid-solid interfaces with heterogeneous catalysis *Phys. Rev. Lett.* 89, 064502, 2002, selected for the July 29 2002 issue of the Virtual Journal of Nanoscale Science and Technology.
- [118] F. Castiglione, M. Bernaschi, S. Succi, M. Kirschner, R. Heinrich, Intracellular signal propagation in a two-dimensional auto-catalytic reaction model, *Phys. Rev. E* 66(3), 031905, (2002).
- [119] P. Vignolo, M.L. Chiofalo, S. Succi, M.P. Tosi, Explicit Finite-Difference and Particle Method for the Dynamics of Mixed Bose-condensate and Cold-Atom Clouds, *J. Comp. Phys.* 182, p.368, (2002).
- [120] A. Lamura, S. Succi, Lattice Boltzmann model of glassy behaviour, *Physica A*, 325, p. 477, (2003).
- [121] A. Lamura, S. Succi, A Lattice Boltzmann glass model, *Int. J. Mod. Phys. B* 17, p.145, (2003).
- [122] M. Bernaschi, S. Succi, Lattice Boltzmann scheme for steady state flows, *Int. J. Mod. Phys. B* 17, p.1 (2003).
- [123] A. D’Orazio, S. Succi, C. Arrighetti, Lattice Boltzmann simulation of open thermal flows, *Phys. Fluids*, 15(9), 2778, (2003).
- [124] F. Toschi, P. Vignolo, S. Succi, M. Tosi, Dynamics of trapped two-component Fermi gas: temperature dependence of the transition from collisionless to collisional regime *Phys. Rev. A, Rap. Comm.* 67(4), art. 041605, (2003).
- [125] P. Love, B. Boghosian, I. Karlin, S. Succi, J. Yepez, Galilean invariant Lattice Boltzmann models with H-theorem, *Phys. Rev. E*, 68, art. 025103(R), (2003).
- [126] H. Chen, S. Kandasamy, S. Orszag, R. Shock, S. Succi, V. Yakhot, Extended-Boltzmann Kinetic Equation for Turbulent Flows, **Science**, **301**, p.633, (2003)
- [127] S. Ubertini, G. Bella, S. Succi, Lattice Boltzmann method on unstructured grids: Further developments *Phys Rev E* 68 (1) 016701, (2003)
- [128] R. Rotondi, G. Bella, S. Succi, Multiscale Lattice Boltzmann simulation of mass transport at irregular fluid-solid interfaces, *Applied Rheology*, 14(1), p.12-21, (2004).
- [129] S. Melchionna, S. Succi, Electro-rheology in nanopores via Lattice Boltzmann simulation, *J. Chem. Phys.*, 120(9), p.4492, (2004).

- [130] F. Toschi, P. Vignolo, P. Capuzzi, S. Succi, M. Tosi, Dynamics of trapped Fermion clouds, *Laser Phys.*, 14(2), p.302, (2004).
- [131] A. D’Orazio, S. Succi, C. Arrighetti, Thermal boundary conditions for a doubled-populations Lattice Boltzmann model: simulation of channel flows, *Future Generation Computer Systems*, 20, p.935, (2004).
- [132] A. Lamura, S. Succi, A Lattice Boltzmann model with random dynamical constraints, *Europ. Phys. J. B*, 39, p. 241 (2004).
- [133] S. Ubertini, S. Succi and G. Bella, Lattice Boltzmann without coordinates, *Phil. Trans. R. Soc. London A*, 362, p. 1763 (2004).
- [134] F. Toschi, P. Capuzzi, S. Succi, M. Tosi, P. Vignolo, Fermion vapours simulation, *J. Phys. B: At. Mol. Opt. Physics*, 37, S91-99 (2004).
- [135] S. Ansumali, I. Karlin, S. Succi, Kinetic theory of turbulence modeling: smallness parameter, scaling and derivation of Smagorinsky model, *Physica A*, 338(3-4), p. 379 (2004).
- [136] H. Chen, S. Orszag, I. Staroselsky and S. Succi, Expanded analogy between Boltzmann Kinetic Theory of Fluids and Turbulence, *J. Fluid Mech.*, 519, p. 301-314, (2004).
- [137] W. Miller, I. Rasin and S. Succi, Lattice Boltzmann simulations of flows with phase transitions, *Trends in Statistical Physics*, 4, 123-133, (2004) .
- [138] A. Minguzzi, S. Succi, F. Toschi, M. Tosi, P. Vignolo, Numerical simulation of Bose-Einstein condensates and Fermi vapours *Phys. Reports*, 395, issue 4-5 (June 2004) p. 223-355.
- [139] S. Succi, F. Toschi, P. Capuzzi, P. Vignolo and M. Tosi, A particle-dynamics study of dissipation in colliding clouds of ultracold fermions, *Phil. Trans. R. Soc. London A*, 362, p.1605 (2004).
- [140] P. Capuzzi, P. Vignolo, F. Toschi, S. Succi and M. Tosi, Effects of collisions against thermal impurities in the dynamics of a trapped fermion gas, *Phys. Rev. A*, 70, 043623, (2004).
- [141] R. Benzi, L. Biferale, M. Sbragaglia, S. Succi and F. Toschi, Non hydrodynamic modes in shell models of turbulence: a Lattice Boltzmann study, *Physica D*, 197, 303, (2004).
- [142] F. Toschi, S. Succi, Lattice Boltzmann simulation at finite Knudsen numbers, *Europhys. Lett.*, 69(4), p. 549, (2005).
- [143] S. Ubertini, S. Succi, Recent advances of lattice Boltzmann techniques on unstructured grids, *Progress in Computational Fluid Dynamics*, 5, (1/2), p. 85, (2005).
- [144] F. Castiglione, S. Succi, Simulating the G-protein cAMP pathway with a two-compartment reactive lattice gas, *Theory in Biosciences*, 123, p.413, (2005).
- [145] I. Rasin, W. Miller and S. Succi, A multi-relaxation lattice kinetic method for passive scalar diffusion, *J. Comp. Phys.*, 206, p.45, (2005).
- [146] S. Melchionna, S. Succi, Electro-rheology in nanopores via Lattice Boltzmann simulation *Comp. Phys. Commun.*, 169, p.203, (2005).

- [147] M. Sbragaglia and S. Succi, Analytical calculation of slip flow in lattice Boltzmann models with kinetic boundary conditions, *Phys. Fluids*, *17*, 093602 (2005).
- [148] N. Rossi, S. Ubertini, S. Succi and G. Bella, Unstructured lattice Boltzmann in three dimensions, *Int. J. Num. Meth. in Fluids*, *49*(6), p. 619, (2005)
- [149] S. Succi, F. Toschi, M.P. Tosi and P. Vignolo, Exploring Bose-Einstein condensates by numerical solution of the Gross-Pitaevskii equation, *Computing in Science and Engineering*, *7*(6), p. 48-57, (2005).
- [150] H. Basagaoglu, P. Meakin and S. Succi, Energy Dissipation measures in Three-Dimensional Porous Media, *Phys. Rev. E*, *72*, 046705, (2005).
- [151] F. Federici, C. Cherubini, S. Succi and M.P. Tosi, Excised black-holes: the scattering problem in the time domain, *Phys. Rev. D*, *72*, 084016, (2005).
- [152] A. Lamura, S. Succi, Lattice mesoscopic model for dynamic heterogeneous fluids, *Phys. Rev. Lett.*, *95*, 224502, (2005).
- [153] F. Castiglione, F. Toschi, M. Bernaschi, S. Succi, R. Benedetti, B. Falini, A. Liso, Computational modelling of immune response to tumor antigens, *J. Theor. Biology*, *237*(4), p. 390-400, (2005).
- [154] R. Benzi, L. Biferale, M. Sbragaglia, S. Succi, and F. Toschi, Mesoscopic modelling of heterogeneous boundary conditions for microchannel flows, *J. Fluid Mech.*, *548*, p.257-280 (2006).
- [155] I. Rasin, W. Miller and S. Succi, Phase-field lattice kinetic scheme for the numerical simulation of dendritic growth, *Phys. Rev. E*, *72*, 066705, (2006).
- [156] M. Sbragaglia and S. Succi, A note on Lattice Boltzmann models beyond the Chapman-Enskog limit, *Europhys. Lett.*, *73*, p.370-376 (2006).
- [157] S. Melchionna, S. Succi, and J.P. Hansen, Simulation of single-file ion transport with the Lattice Fokker-Planck equation, *Phys. Rev. E*, *73*, 017701, (2006).
- [158] S. Succi, Discrete dispersion relations and the breaking of Lorentz invariance, *Classical and Quantum Gravity*, *23*, p.1989-1997, (2006).
- [159] S. Succi, H. Chen, S. Orszag, A note on relaxation approximations in lattice kinetic theory, *Physica A*, *362*, 1-5 (2006).
- [160] J. Latt, B. Chopard, S. Succi and F. Toschi, Numerical analysis of the averaged flow field in a turbulent lattice Boltzmann simulation, *Physica A*, *362*, 6-10 (2006).
- [161] I. Rasin, W. Miller and S. Succi, Lattice Boltzmann phase-field modelling of binary-alloy solidification, *Physica A*, *362*, 257-280 (2006).
- [162] F. Federici, C. Cherubini, S. Succi and M.P. Tosi, Superradiance from hydrodynamic vortices: a numerical study, *Phys. Rev. A*, *73*(3), 033604, (2006).
- [163] H. Basagaoglu, P. Meakin, R. Rotondi, S. Succi, Boundary effects on the onset of nonlinear flow in porous domains, *Europhys. Lett.*, *73*, 858-863, (2006)

- [164] S. Succi, S. Melchionna and J.P. Hansen, Lattice Fokker-Planck equation, *Int. J. Mod. Phys. C*, 17, 459-470, (2006).
- [165] R. Benzi, L. Biferale, M. Sbragaglia, S. Succi, and F. Toschi, Mesoscopic two-phase model to describe apparent slip flow in microchannels, *Europhys. Lett.*, 74, 651-657, (2006).
- [166] J. Horbach, S. Succi, Lattice Boltzmann versus Molecular Dynamics simulation of nano-hydrodynamic flows, *Phys. Rev. Lett.*, 96, 224503, (2006).
- [167] S. Succi, Review on 'Invariant Manifolds for Physical Kinetics' (by A. Gorban and I. Karlin), *Bulletin of the London Mathematical Society: Book Reviews*, 521-525, (2006).
- [168] A. Lamura, S. Succi, Lattice Boltzmann scheme for fluids with dynamic heterogeneities, *Phys. Rev. E*, 73(6), art. 066707, (2006)
- [169] D. Moroni, B. Rotenberg, J.P. Hansen, S. Melchionna, and S. Succi, Solving the Fokker-Planck kinetic equation on a lattice, *Phys. Rev. E*, 73(6), art. 066706, (2006).
- [170] D. Moroni, J.P. Hansen, S. Melchionna and S. Succi, On the use of the lattice Fokker-Planck models for hydrodynamics, *Europhys. Lett.*, 75(3), p. 399-405, (2006).
- [171] S. Orszag, H. Chen, B. Chopard, J. Latt and S. Succi, Turbulence effects on kinetic equations, *J. Sci. Computing*, 28(2-3), p. 459-466, (2006).
- [172] A. Xu, S. Succi and B. Boghosian, Lattice BBGKY scheme for non ideal-fluid flows *Mathematics and Computers in Simulation*, 72, p.249-252, (2006).
- [173] S. Ubertini, G. Bella and S. Succi, Unstructured lattice Boltzmann equation with memory *Mathematics and Computers in Simulation*, 72,(2-6), p.237-241, (2006).
- [174] M. Sbragaglia, R. Benzi, L. Biferale, S. Succi, and F. Toschi, Surface roughness-hydrophobicity coupling in microchannel and nanochannel flows, *Phys. Rev. Lett.*, 97, 204503, (2006)
- [175] F. Tosi, S. Ubertini, S. Succi, H. Chen and I. Karlin, Numerical stability of entropic versus positivity enforcing schemes *Mathematics and Computers in Simulation*, 72,(2-6), p.227-231, (2006).
- [176] M. Chinappi, E. de Angelis, S. Melchionna, C.M. Casciola, S. Succi and R. Piva, Molecular dynamics simulation of ratchet motion in an asymmetric nano-channel, *Phys. Rev. Lett.*, 97, 144509, (2006).
- [177] F. Tosi, S. Ubertini, S. Succi H. Chen and I.V. Karlin, A Comparison of single-time relaxation Lattice Boltzmann schemes with enhanced stability, *Int. J. Mod. Phys C*, 17, 1375-1390, (2006).
- [178] R. Benzi, L. Biferale, M. Sbragaglia, S. Succi, and F. Toschi, Mesoscopic modeling of two-phase flow in presence of boundaries: the Contact Angle, *Phys. Rev. E*, 74(2), 021509 (2006).
- [179] M. Fyta, S. Melchionna, S. Succi and E. Kaxiras, Multiscale coupling of molecular dynamics and hydrodynamics: application to DNA translocation through a nanopore, *Multiscale Modeling and Simulation*, 5, 1156, (2006).

- [180] H. Basagaoglu, P. Meakin, S. Succi and R. Rotondi, Density Fluctuations in lattice Boltzmann simulations of multiphase fluids in a closed system, *Physica A*, 374, 691 (2007).
- [181] M. Sbragaglia, R. Benzi, L. Biferale, S. Succi, K. Sujiyama and F. Toschi, Generalized Lattice Boltzmann Method with multi-range pseudo-potential, *Phys. Rev. E*, 75, 026702, (2007).
- [182] F. Castiglione, A. Liso, M. Bernaschi and S. Succi, Microscopic simulation in Biology and Medicine, *Current Medicinal Chemistry*, 14, 675, (2007).
- [183] F. Tosi, S. Ubertini, S. Succi and I.V. Karlin, Optimization strategies for the entropic Lattice Boltzmann method, *J. of Scientific Computing*, 30, 369 (2007)
- [184] S. Succi, Lattice Boltzmann for quantum field theory, *J. Phys. A: Math. Theor.*, *J. Phys. A: Math. Theor.* 40 (2007) F559-F567.
- [185] S. Palpacelli, S. Succi, Numerical validation of the quantum Lattice Boltzmann scheme in two and three-dimensions, *Phys. Rev. E*, 75, 066704, (2007).
- [186] S. Succi, R. Benzi, L. Biferale, M. Sbragaglia, and F. Toschi, Lattice kinetic theory as a form of supra-molecular dynamics for computational microfluidics, *Bulletin of the Polish Academy of Sciences*, 55(2), p.151, (2007).
- [187] M. Fyta, S. Melchionna, S. Succi and E. Kaxiras, Exploring DNA translocation through a nanopore via a multiscale lattice-Boltzmann Molecular-Dynamics methodology, *Int. J. Mod. Phys. C*, 18(4), 685, (2007)
- [188] S. Succi, A.A. Mohamad and J. Horbach, Lattice-Boltzmann simulation of dense nanoflows: a comparison with molecular dynamics and Navier-Stokes solutions, *Int. J. Mod. Phys. C*, 18(4), p. 667, (2007)
- [189] R. Benzi, L. Biferale, M. Sbragaglia, S. Succi, and F. Toschi, Mesoscopic modeling of fluid flows in micro and nano-channels, *Int. J. Mod. Phys. C*, 18(4), p. 758, (2007).
- [190] W. Miller and S. Succi, Lattice gas modeling of nanowhisker growth, *Physical Review E*, 73, 031601, (2007).
- [191] S. Palpacelli, S. Succi and R. Spigler Ground state computation of Bose-Einstein condensates by an imaginary-time quantum Lattice Boltzmann scheme, *Phys. Rev. E* 76, 036712, (2007).
- [192] G. Falcucci, G. Bella, G. Chiatti, S. Chibbaro, M. Sbragaglia and S. Succi, Lattice-Boltzmann models with mid-range repulsive interactions, *Commun. in Comp. Phys.*, 2, 1055, (2007)
- [193] R. Benzi, L. Biferale, M. Sbragaglia, S. Succi and F. Toschi, Wetting-dewetting transition of two-phase flows in nano-corrugated channels, *J. of Computer Aided Materials Design*, 14, 447, (2007)
- [194] M. Fyta, S. Melchionna, S. Succi and E. Kaxiras, Multiscale modeling of biopolymer translocation through a nanopore, *Springer Series in Computer Science*, **Best Workshop Paper Award**, **7th Int. Conf. on Computational Science**, **Lecture Notes in Computational Science**, **4487**, **786**, (2007) Beijing, May 2007.

- [195] S. Ubertini and S. Succi, A generalised lattice Boltzmann equation on unstructured grids, *Commun. in Comp. Phys.*, 3, 342 (2008)
- [196] M. Fyta, S. Melchionna, E. Kaxiras and S. Succi, Multiscale simulation of nano-biological flows, *Computing in Science and Engineering*, 4, 10, July/August (2008)
- [197] M. Bernaschi, S. Melchionna, S. Succi, M. Fyta and E. Kaxiras, Quantized current blockade and hydrodynamic correlations in biopolymer translocation through nanopores: evidence from multiscale simulations, *Nanoletters*, 8, 1115 (2008)
- [198] H. Basagaoglu, P. Meakin, S. Succi and T. Ginn, Two-dimensional lattice-Boltzmann simulation of colloidal migration in rough-walled narrow flow channels, *Phys. Rev. E*, 77, 031405, (2008).
- [199] D. Bini and S. Succi, Analogy between capillary motion and Friedmann-Robertson-Walker cosmology *Europhys. Lett.*, 82, 34003, (2008).
- [200] G. Falcucci, S. Chibbaro, S. Succi, X. Shan and H. Chen, Lattice Boltzmann spray-like fluids, *Europhys. Lett.*, 82, 24005, (2008).
- [201] S. Palpacelli and S. Succi, Quantum Lattice Boltzmann simulation of expanding Bose-Einstein condensates in random potentials, *Phys Rev E*, 77, 066708, (2008).
- [202] A. Kuzmin, A. M. Mohamad, S. Succi, Multi-relaxation time Lattice Boltzmann Model for multiphase flows, *Int. J. Mod. Phys. C*, 19, 875, (2008).
- [203] S. Chibbaro, S. Succi, G. Falcucci, G. Chiatti, X. Shan and H. Chen, Lattice Boltzmann models for non-ideal fluids with arrested phase-separation, *Phys. Rev. E*, 77, 036705 (2008).
- [204] S. Succi, Lattice Boltzmann across scales: from turbulence to DNA translocation, *European Physical Journal B: Condensed Matter*, 64, 471 (2008)
- [205] M. Fyta, S. Melchionna, S. Succi and E. Kaxiras, Hydrodynamic correlations in the translocation of a biopolymer through a nanopore: Theory and multiscale simulations, *Phys. Rev. E*, 78, 036704 (2008).
- [206] M. Chinappi, S. Melchionna, C. Casciola and S. Succi, Hydrodynamic versus single-file transport in asymmetric nano-channels, *J. Chem. Phys.*, 129, 124717, (2008).
- [207] F. Diotallevi, L. Biferale, S. Chibbaro, A. Puglisi and S. Succi, Front pinning in capillary filling of chemically coated channels *Phys. Rev. E*, 78, 036305, (2008).
- [208] R. Adhikari and S. Succi, Duality in matrix lattice Boltzmann models, *Phys. Rev. E*, 78, 066701 (2008)
- [209] S. Palpacelli and S. Succi, The quantum Lattice Boltzmann equation: recent developments, *Commun. in Comp. Phys.*, 4, 980 (2008)
- [210] Melchionna S, Rybicki FJ, Mitsouras D, et al. Non-invasive Prediction of Localization and Progression of Coronary Disease in Man Using Shear Stress Profiles Derived from 320-Row Detector Computed Tomography: Implications for Widespread Screening *Circulation*, 118, S845-S845, Suppl. 2 (2008)

- [211] E. Kaxiras and S. Succi, Multiscale simulations of complex systems: computation meets reality, *Scientific Modeling and Simulation*, 15, 59 (2008).
- [212] S. Chibbaro, L. Biferale, F. Diotallevi, S. Succi, A. Dimitrov, A. Milchev, K. Binder, S. Girardo and D. Pisignano, Evidence of thin-film precursors formation in hydrokinetic and atomistic simulations of nano-channel capillary filling *Europhys. Lett.*, 84, 44003 (2008)
- [213] R. Benzi, S. Chibbaro and S. Succi, Mesoscopic Lattice Boltzmann modeling of flowing soft systems, *Physical Review Letters*, 102, 026002 (2009)
- [214] F. J. Rybicki et al, Prediction of Coronary Artery Plaque Progression and Potential Rupture from 320-Detector Row Prospectively ECG-gated Single Heart Beat CT Angiography: Lattice Boltzmann Evaluation of Endothelial Shear Stress, *Int. J. of Cardiovascular Imaging*, DOI 10.1007/s10554-008-9418-x, (2009)
- [215] F. Diotallevi, L. Biferale, S. Chibbaro, G. Pontrelli, S. Succi and F. Toschi, Capillary filling using lattice Boltzmann equations: the case of multi-phase flows, *European Physical Journal-Special Topics*, 166, 111 (2009)
- [216] S. Melchionna, M. Bernaschi, M. Fyta, E. Kaxiras and S. Succi, Quantized biopolymer translocation through nanopores: departure from simple scaling, *Phys. Rev. E*, 79, 030901(R), (2009)
- [217] S. Girardo, R. Cingolani, S. Chibbaro, F. Diotallevi, S. Succi and D. Pisignano, Thin film precursor formation during capillary penetration in microchannels, *Applied Physics Letters*, 94, 171901 (2009)
- [218] S. Chibbaro, L. Biferale, F. Diotallevi and S. Succi, Capillary filling for multi-component fluids using the pseudo-potential Lattice Boltzmann method, *European Physical Journal-Special Topics*: 171, 223-228, (2009)
- [219] F. Diotallevi, L. Biferale, S. Chibbaro, G. Pontrelli and S. Succi, Lattice Boltzmann simulations of capillary filling: finite vapour density effects, *European Physical Journal-Special Topics*: 171, 237-243, (2009)
- [220] A. Mohamad and S. Succi, A note on equilibrium boundary conditions in lattice Boltzmann fluid dynamic simulations, *European Physical Journal-Special Topics*: 171, 213-221, (2009)
- [221] M. Sbragaglia, H. Chen, X. Shan and S. Succi, Continuum free-energy formulation for a class of lattice Boltzmann multiphase models, *Europhys. Lett.*, 86, 24005, (2009).
- [222] G. Falcucci, G. Chiatti, S. Succi, A. A. Mohamad, A. Kuzmin, Rupture of a ferrofluid droplet in external magnetic fields using a single-component lattice Boltzmann model for non-ideal fluids, *Phys. Rev. E*, 79, 056706 (2009).
- [223] F. Diotallevi, A. Puglisi, A. Lamura and S. Succi, Capillary filling with randomly coated walls, *J. Stat. Phys: Theory and Experiment*, L02001, (2009),
- [224] M. Fyta, S. Melchionna, M. Bernaschi, S. Melchionna, E. Kaxiras and S. Succi, Numerical simulation of conformational variability in biopolymer translocation through wide nanopores, *J. Stat. Mechanics: Theory and Experiment*, P06009, (2009)

- [225] G. Pontrelli, S. Ubertini and S. Succi, The unstructured Lattice Boltzmann method for non-newtonian flows, *J. Stat. Mechanics: Theory and Experiment*, P06005, (2009)
- [226] S. Chibbaro, L. Biferale, K. Binder, D. Dimitrov, F. Diotallevi, A. Milchev and S. Succi, Hydrokinetic simulations of nanoscopic precursor films in rough channels, *J. Stat. Mechanics: Theory and Experiment*, P06007, (2009)
- [227] M. Sbragaglia, R. Benzi, L. Biferale, H. Chen, X. Shan and S. Succi, Lattice Boltzmann method with self-consistent thermo-hydrodynamic equilibria, *J. Fluid Mech.*, 628, 299-309, (2009)
- [228] H. Basagaoglu, S. Succi, C. Manepally, R. Fedors, D.Y. Wyrick, Sensitivity of the active fracture model parameter to fracture network orientation and injection scenarios, *Hydrogeology Journal*, 17, 1347-1358, (2009).
- [229] M. Bernaschi, S. Melchionna, S. Succi, M. Fyta, E. Kaxiras and J. Sircar, MUPHY: a parallel MUltiPHYsics/scale code for high-performance bio-fluidic simulations, *Comp. Phys. Comm.*, 180, 1495-1502, (2009)
- [230] S. Chibbaro, F. Diotallevi, E. Costa, D. Dimitrov, A. Milchev, D. Palmieri and S. Succi Capillary filling in microchannels with wall corrugations- A comparative study by continuum, kinetic and atomistic approaches, *Langmuir*, 25, 12653 (2009)
- [231] D. Chiappini, G. Bella, S. Succi and S. Ubertini, Applications of finite-difference lattice Boltzmann method to breakup and coalescence in multiphase flows, *Int. J. Mod. Phys. C*, 20, 1803, (2009),
- [232] R. Benzi, M.Sbragaglia, S. Succi, M. Bernaschi and S. Chibbaro, Mesoscopic lattice Boltzmann modeling of soft-glassy systems: theory and simulations, *J. Chem. Phys.*, 131, 104903, (2009).
- [233] S. Melchionna, M. Bernaschi, S. Succi et al, Hydrokinetic approach to large-scale cardiovascular flows, *Comp. Phys. Comm.*, 181, 462-472, (2010).
- [234] D. Chiappini, G. Bella, S. Succi, F. Toschi and S. Ubertini, Improved Lattice Boltzmann without parasitic currents for Rayleigh-Taylor instability, *Commun. in Comp. Phys.*, 7, 423-444, (2010)
- [235] M. Bernaschi, M. Fatica, S. Melchionna, S. Succi and E. Kaxiras, A flexible high performance Lattice Boltzmann GPU code for the simulations of fluid flows in complex geometries, *Concurrency: Practice and Experience*, 22, 1-14, (2010)
- [236] M. Bernaschi, L. Rossi, R. Benzi, M. Sbragaglia and S. Succi, GPU implementation of lattice Boltzmann models for flowing soft systems, *Phys. Rev. E*, 80, 066707 (2010)
- [237] S. Ubertini, P. Asinari and S. Succi, Three ways to lattice Boltzmann: a unified time-marching procedure, *Phys. Rev. E*, 81, 016311, (2010).
- [238] J. Russo, J. Horbach, F. Sciortino and S. Succi, Nanoflows through disordered media: a joint Lattice Boltzmann and Molecular Dynamics investigation, *Europhys. Letters*, 89, 44001, (2010)
- [239] H. Basagaoglu and S. Succi, Lattice Boltzmann simulations of repulsive particle-particle and particle-wall interactions: coughing and chocking *J. Chem. Phys.*, 132, 134111, (2010)

- [240] S. Succi, M. Sbragaglia, S. Ubertini, The Lattice Boltzmann method, **Scholarpedia** **5(5):9507**, (2010).
- [241] S. Palpacelli and S. Succi, Quantum state reduction in Bose-Einstein condensates with attractive interactions, *Int. J. Mod. Phys. C*, *21*, 629-646 (2010).
- [242] G. Falcucci, S. Succi and S. Ubertini, Magnetic-driven droplet break-up and vaporization: a lattice Boltzmann study, *JSTAT*, *P05010*, (2010).
- [243] J. Janela, G. Pontrelli, A. Sequeira, S. Succi, S. Ubertini, Unstructured Lattice-Boltzmann method for shear dependent viscosity, *Int. J. Mod. Phys. C*, *21*, 795 (2010).
- [244] M. Mendoza, B. Boghosian, H. Hermann and S. Succi, Fast Lattice Boltzmann solver for relativistic hydrodynamics, *Phys. Rev. Lett.*, *105*, 014502 (2010) **Cover page of the PRL issue, July 2, 2010**
- [245] F. Chen, A. Xu, G. Zhang, Y. Li and S. Succi, Multiple-relaxation-time lattice Boltzmann approach to compressible flows with flexible specific-heat ratio and Prandtl number, *EPL*, *90*, 54003, (2010).
- [246] G. Falcucci, S. Ubertini and S. Succi, Lattice Boltzmann simulations of phase-separating flows with large density ratios: the case of doubly-attractive pseudo-potentials, *Soft Matter*, *6*, 4357 (2010).
- [247] R. Benzi, M. Bernaschi, M. Sbragaglia and S. Succi, Emergent Herschel-Bulkley rheology from mesoscopic simulations, *EPL*, *91*, 14003, (2010)
- [248] M. Mendoza, B. Boghosian, H. Herrmann and S. Succi, Derivation of the Lattice Boltzmann Model for Relativistic Hydrodynamics, (Isaac Newton Institute preprint, NI10029-KIT, 2010, Cambridge, UK), *Phys. Rev. D*, *82*, 105008 (2010)
- [249] S. Succi, A note on the analogy between quantum gravity and fluid turbulence, *Int. J. Mod. Phys. C*, *21*, 1329-1340 (2010)
- [250] A. Peters et al, Multiscale simulation of cardiovascular flows on the IBM Bluegene/P: full heart circulation system at near red-cell resolution, **Honorable Mention at the 2011 final of the Gordon Bell Prize**.
- [251] D. Kauzlaric et al, Bottom-up coarse-graining of a simple graphene model, *J. Chem. Phys.*, *134*, 064106, (2011).
- [252] S. Succi, S. Palpacelli, A prospective merger between Car-Parrinello and Lattice Boltzmann methods, *Comm. in Comp. Phys.*, *9*, 1137, (2011)
- [253] A. De Maio, S. Palpacelli and S. Succi, A new boundary condition for three-dimensional Lattice Boltzmann simulations of capillary filling in rough microchannels *Comm. in Comp. Phys.*, *9*, 1284, (2011).
- [254] A. Gizzi et al, Three-band decomposition analysis of wall shear stress in pulsatile flows, *Phys. Rev. E*, *83*, 031902 (2011).
- [255] G. Falcucci et al, Lattice Boltzmann methods for multiphase flow simulations across scales, *Comm. in Comp. Phys.*, *9(2)*, 269, (2011).
- [256] A11.06 D. Lapitski, P. Dellar, S. Palpacelli and S. Succi, On the isotropy of the three-dimensional quantum Lattice Boltzmann scheme, *Phys. Rev. E*, *83*, 046706, (2011).

- [257] R. Benzi, M. Sbragaglia, M. Bernaschi and S. Succi, Phase-field model of long-time glass-like relaxation in binary fluid mixtures, *Phys. Rev. Lett.*, *106*, 164501, (2011).
- [258] M. Mendoza, H. Hermann and S. Succi, Pre-turbulent regimes in graphene flows, *Phys. Rev. Lett.*, *106*, 156601, (2011)
- [259] S. Melchionna et al, Endothelial shear stress hemodynamic simulation, *Phil. Trans. Roy. Soc.*, *369*, 2354, (2011)
- [260] I. Karlin, P. Asinari and S. Succi Matrix Lattice Boltzmann reloaded, *Phil. Trans. Roy. Soc.*, *369*, 2202, (2011)
- [261] L. Biferale, P.V. Coveney, S. Ubertini and S. Succi, *Preface to the Special Issue of the Phil. Trans. Roy. Soc.*, Discrete Simulation in Fluid Dynamics: Methods, *Phil. Trans. Roy. Soc.*, *369*, 2152, (2011)
- [262] M. Fyta, S. Melchionna and S. Succi, Translocation of biomolecules through solid-state nanopores: theory meets experiments, *J. of Polym. Sci. B: Polymer physics*, *49*(14), 985 (2011), **Cover page of the issue**
- [263] R. Benzi, M. Sbragaglia, M. Bernaschi and S. Succi, Shear Banding from lattice kinetic models with competing interactions, *Phil. Trans. Roy. Soc.*, *369*, 2439, (2011)
- [264] L. Biferale, P.V. Coveney, S. Ubertini and S. Succi, *Preface to the Special Issue of the Phil. Trans. Roy. Soc.*, *Discrete Simulation in Fluid Dynamics: Applications*, *389*, 2384, (2011).
- [265] D. Kauzlaric, P. Espanol, A. Greiner, and S. Succi, Three routes to the friction matrix and their application to the coarse-graining of atomic lattices, *Macromolecular Theory and Simulations*, *20*, 526, (2011).
- [266] P. Romatsche, M. Miller and S. Succi, A fully relativistic lattice Boltzmann algorithm, *Phys. Rev. C* *84*, 034903 (2011).
- [267] G. Pontrelli, C. Koenig, I. Halliday, M. Collins, and S. Succi, Modelling wall shear stress in small arteries using LBM and FVM: influence of the endothelial wall profile, *Medical Engineering and Physics*, *33*, 832 (2011)
- [268] I. Mazzitelli, M. Venturoli, S. Melchionna and S. Succi, Towards a mesoscopic model of water-like fluids with hydrodynamic interactions, *J. Chem. Phys.* *135*, 124902 (2011)
- [269] A. Zarghami, M.J. Maghrebi, S. Ubertini, and S. Succi, Modeling of bifurcation phenomena in suddenly expanded flows with a new finite volume lattice Boltzmann method *Int. J. Mod. Phys. C*, *22*(9), 977-1003, (2011).
- [270] S. Hanasoge, S. Succi and S. Orszag, Lattice BGK formulation of Electromagnetic Wave Propagation, *96*, 14002, (2011)
- [271] A. Petersen, E.H. Stanley and S. Succi, Statistical regularities in the rank-citation profile of scientists, **Nature Scientific Reports**, (2011), **in press**
- [272] M. Bernaschi et al, Petaflop biofluidic simulations on a two-million core system, Supercomputing 2011, **Gordon Bell finalist and Honorable Mention (2011)**

- [273] I. Karlin and S. Succi, Comment on "Numerics of the lattice Boltzmann method: Effects of collision models on the lattice Boltzmann simulations, *Physical Review E* 84, 068701 (2011).
- [274] D. Hupp, M. Mendoza, I. Bouras S. Succi and H. J. Herrmann On the relativistic Lattice Boltzmann method for quark-gluon plasma simulations *Physical Review D*, 84, 125015 (2011).
- [275] G. Falcucci, S. Ubertini, D. Chiappini and S. Succi, Modern Lattice Boltzmann methods for multiphase microflows, *IMA Journal of Applied Mathematics*, *accepted*
- [276] M. Bisson, M. Bernaschi, S. Melchionna, E. Kaxiras and S. Succi, Multi-scale hemodynamics using clusters of GPU, *Comm. in Comp. Phys.*, *accepted* (2011).
- [277] R. Benzi, M. Bernaschi, M. Sbragaglia and S. Succi, Heterogeneous diffuse interfaces: a new mechanism for arrested coarsening in binary mixtures, *accepted*, (2011).
- [278] S. Girardo et al, Precursor-enhanced friction in spontaneous liquid imbibition on random nanostructured roughness, in press.
- [279] M. Sbragaglia, R. Benzi, M. Bernaschi, L. Rossi and S. Succi, Lattice Boltzmann modeling of soft-amorphous systems: theory and simulation, submitted.
- [280] H. Basagaoglu, S. Melchionna, S. Allwein, S. Succi, V. Yakhot, H. Dixon, Particle Thermal Fluctuations in an Isothermal Flow in Two-Dimensional Flow Channels via Fluctuating Colloidal Lattice-Boltzmann Model, , submitted, (2011)
- [281] C. Colosqui, G. Falcucci, S. Ubertini and S. Succi, Mesoscopic simulation of non-ideal flows with dynamically self-tuned equation of state, *accepted*, (2012)
- [282] S. Palpacelli, A. De Maio, S. Girardo, D. Pisignano and S. Succi, Interplay between shape and roughness effects on capillary front propagation, *submitted*, (2011).
- [283] M. Miller, H.J. Herrmann and S. Succi , Hydrodynamic model of graphene conductivity, *submitted*, (2011).
- [284] S. Succi, Analogy between turbulence and quantum gravity: beyond Kolmogorov's 1941 theory *accepted*, (2011).
- [285] S. Melchionna et al, Supercomputer simulation suggests new sensitivity indicator for risk assessment of atherosclerotic plaques, *submitted*, (2011).
- [286] G. Falcucci, S. Ubertini, G. Bella, and S. Succi, Lattice Boltzmann simulations of cavitating flows, *submitted*, (2011).
- [287] S. Singh, S. Krithivasan, I. Karlin, S. Succi and S. Ansumali, Energy conserving lattice Boltzmann models for in-compressible flow simulations, *submitted*, (2011).
- [288] A. Fuchs, D. Kauzlaric, A. Greiner, S. Succi and J. Korvink, Molecular dynamics simulations of nanoparticle interactions with a planar wall: does shape matter? *submitted*, (2011).

- [289] D. Bini, D. Gregoris and S. Succi, Kinetic theory in a curved spacetime: applications to the Poynting-Robertson effect, *submitted*, (2011).
- [290] A. De Rosis, G. Falcucci, S. Ubertini, F. Ubertini and S. Succi, Lattice Boltzmann Analysis of Fluid-Structure Interaction with Moving Boundaries, *submitted*
- [291] D. Kauzlaric, A. Liba, Y. Hanein, P. Espanol, A. Greiner, S. Succi and J. Korvink, Top-down vs Bottom-up coarse-graining of graphene and CNT's for nanodevice simulations, *IEEE Explore*, *accepted*
- [292] M. Miller, S. Succi and H.J. Herrmann , Taylor-Couette Instability in General Manifolds: A Lattice Kinetic Approach, *submitted*, (2011).
- [293] V. Yermakou and S. Succi, Lattice Boltzmann scheme for the KPZ equation, *submitted*, (2012).
- [294] D. Bini, A. Geralico and S. Succi, Particle scattering by a test fluid on a Schwarzschild spacetime: the equation of state matters, *submitted*, (2012).

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### Dr. Sauro Succi: Publications in Conference Proceedings

1. S. Succi, G. Lister, Neutral Beam Halo Calculations and Charge Exchange Losses in the ASDEX Tokamak, Int. Symp. on Heating in Toroidal Plasmas, vol. 2, 587, Grenoble, March 1982.
2. ASDEX and Neutral Injection teams, First Results from Neutral Beam Heating of Diverted ASDEX Discharges, *ibidem*.
3. S. Succi, G. Lister, Metodi Montecarlo in fisica dei plasmi, Seminario Nazionale Italiano sulla fisica del reattore e teoria del trasporto, vol.1, 423, Bologna, Marzo 1983.
4. K. Appert, A. H. Kritz, S. Succi and J. Vaclavik, Numerical Studies on the influence of runaways in Current Drive, 12th Meet. of the Europ. Phys. Society, vol. 2, 329, Aachen, September 1983.
5. K. Appert, S. Succi, J. Vaclavik and L. Villard, Alfvén Wave Heating, The Spring College on Radiation in Plasmas, vol.1, 199, Trieste, May 1983.
6. S. Succi, K. Appert, L. Muschietti, J. Vaclavik and J. Wersinger, Dependence of LH generated currents on the spectral distribution of the RF source, 4th Int. Symp. on Heating in Toroidal Plasmas, vol. 2, 661, Rome, March 1984.
7. S. Succi, K. Appert and J. Vaclavik, Consistent and Nonconsistent Quasilinear Models of Lower Hybrid Current Drive, *proc. of Inv. papers*, 2nd Int. Conf. on Plasma Physics, vol. 1, 247, Lausanne, July 1984.
8. T. Hellsten, K. Appert, W. Core, H. Hamnen and S. Succi, Effect of particle Trapping in ICRF Beam heated Tokamak Plasmas, 12th E.P.S. Conf. on Controlled Fusion and Plasma Physics, Budapest September 1985, vol. 1, 124.
9. S. Succi, K. Appert and J. Vaclavik, Numerical Studies of Lower Hybrid Current Drive in the Presence of an Electric Field, 13th E.P.S. Conf. on Plasma Physics, Schliersee, April 1986, vol.2, 405.
10. S. Succi, K. Appert and J. Vaclavik, ADLER a 2D + 2D Quasilinear code *Proc. of the contributed papers to the 8th Europ. Conf. on Computational Physics*, vol. 1, 113, Eibsee, April 1986
11. S. Succi, F. Szelenyi and P. Santangelo, Vector and Parallel Processing of Lattice Gas Models on IBM 3090/VF, *Proc. of the 2nd Int. Conf. on Vector and Parallel Computing*, Tromso, Norway, June 1988, Chap. 31, 375.
12. S. Succi, R. Benzi and F. Higuera, Lattice Gas Methods for Homogeneous and Inhomogeneous Hydrodynamics, *Proc. of the Int. Conf. on "Lattice Gas Kinetics and Foundations of Hydrodynamics"*, Turin Sept. 1988, World Scient. Singapore, p. 329.
13. M. Ottaviani, M. Briscolini, R. Benzi, P. Santangelo and S. Succi, Numerical Studies of Ion gradient driven turbulence, *Proc. of Int. the Conf. on Plasma Fusion Theory*, p.488, Lausanne, October 1988
14. M. Ottaviani, M. Briscolini, R. Benzi, P. Santangelo and S. Succi/, Numerical Simulation of toroidal  $\eta_I$  turbulence, *Proc. of 18th EPS Meet. on Contr. Nuc. Fus. and Plasma Theory*, Venice, March 1989, p. 49.

15. S. Succi, R. Benzi, E. Foti, F. Higuera and F. Szelenyi, Lattice Boltzmann Computing on IBM 3090/VF, Proc. of the Workshop on 'Cellular automata and the Modeling of Complex Systems', Les Houches, Feb. 1989, Springer Proc. in Phys., 46, 178.
16. S. Succi, F. Higuera and F. Szelenyi, Simulations of Three Dimensional Flows with the Lattice Boltzmann Equation on the IBM 3090/VF, ACM Proc. of Int. Conf. on Supercomputing, Kreta, June 1989, p. 128.
17. F. Higuera, S. Succi, Boltzmann Lattice Gases with Lumped lattice sites, Proc. Int. Symp. on Num. Meth. in Eng., p. 273, Lausanne, Sept. 1989.
18. S. Succi and E. Foti, Simulazioni di Mezzi Porosi con metodi di idrodinamica reticolare, IV Convegno Italiano di Meccanica Computazionale, Padua, June 1989, paper n. 78.
19. R. Benzi, S. Succi, M. Vergassola, An Introduction to Lattice Gas Hydrodynamics, Proc. of NATO Advanced Institute on "Relaxation in Complex Systems and Related Topics", Torino, Oct. 89, NATO ASI Series B: Physics Vol.222 p. 329-334
20. M. Briscolini, R. Benzi, G.F. Carnevale, P. Santangelo and S. Succi, Numerical Simulations of three-dimensional flows, Proc. of Int. Conf. on Supercomputing Tools in Science and Engineering, Pisa, Dec. 1989, p. 591.
21. S. Succi, R. Benzi and M. Vergassola, Microscopic and Mesoscopic Simulations of Complex Flows with Cellular Automata and Related Techniques, Proc. of Simulation of Nonlinear Systems in Physics, ENEA, Bologna Bologna, 23-24 Nov. 1989, p.124, World Scientific Singapore.
22. F. Higuera, R. Benzi and S. Succi, Computational Fluid Dynamics with the Lattice Boltzmann Equation, in "Microscopic simulation of complex flows", Brussels, Aug. 1989, Plenum Press New York, p. 71 1990.
23. M. Ottaviani, M. Briscolini, P. Santangelo and S. Succi, Numerical Simulations of anomalous transport on fusion plasmas on the IBM 3090 vector multiprocessor, Int. Conf. on Supercomputing in Nuclear Applications, Mito City, Japan March 12-16 1990, paper AS103, p. 176.
24. S. Succi, A. Cancelliere, C. Chang, E. Foti, M. Gramignani, D. Rothman, Direct calculation of the permeability of three-dimensional porous media, Proc. of the IV Int Conf. on Num. Meth. in Groundwater Resources, Venice, June 1990, Vol. 1 p.128.
25. S. Succi, R. Benzi, F. Stella, M. Vergassola, Int. Symp. on Advances in Comput. Fluid Dynamics, 1990 Winter Meet. of ASME, Dallas, Texas, FED Vol 103, Book n. G00570-1990
26. M. Vergassola, R. Benzi, S. Succi, A Lattice Boltzmann scheme for the Burgers equation, Proceeds of "Propagation of correlations in constrained systems", E. Stanley, N. Ostrowski eds. Kluwer Academ. Press, p.320, 1990. eds., p. 320, 1990
27. S. Succi, R. Benzi, A. Cancelliere, M. Vergassola, The Hydrodynamic Behaviour of the Lattice Boltzmann Equation, Int. Workshop on "Numerical Methods for the Simulation of Complex Flows", Amsterdam, June 1990, Lecture Notes in Physics 398, Springer Verlag, p. 39, 1992.

28. S. Succi, R. Benzi and M. Vergassola, Recent advances in the theory of the lattice Boltzmann equation, proc. of EUROMECH 267, "Discrete Models of Fluid Dynamics", Figuera da Foz, Portugal, 19-22 Sept. 1990, Series on Advances in Mathematics for Applied Sciences, vol 2, p.97, 1991.
29. M. Boschi, M. Ramella, M. Maggiore, F. Stella and S. Succi, An integrated environment to solve industrial fluid dynamics problems using STAR-CD on a IBM 3090. Application to a FIAT-IVECO Diesel engine, Proc. of the Int. Conf. on "Le Calcul Scientifique et L'automobile", Paris, Nov. 1990, paper SIA 90122, p.162-165
30. G. Bella, M. Maggiore, V. Rocco, F. Stella and S. Succi, A study of inlet flow distortion effects on automotive catalytic convertes, Proc. of the 3rd seminar on "The Impact of Supercomputers to Study Aerodynamics and Combustion Phenomena in the Automotive Industry, Milan, Oct. 5, 1990, ATA, April 1991, p.242-250.
31. G. Betello, S. Succi, Levy-flight cellular automata on the IBM RISC/6000 workstation, Proc. of 5th Annual Europ. Computer Conf., Bologna, May 1991, p.695-700.
32. S. Succi and G. Betello, Lattice Gas Computing on a RISC workstation, Proc. 2nd Symp. on High Performance Computing, Montpellier, 7-9 October 1991, p.219
33. S. Succi, R. Benzi, F. Higuera, A. Cancelliere and M. Vergassola, Microscopic and Mesoscopic Simulations of Complex Flows with Cellular Automata and Related Techniques, MOTTEC 1991 (Modern Techniques in Computational Chemistry), chap.27 p.1031-1053, E. Clementi editor, ESCOM 1991.
34. S. Succi, R. Benzi and M. Vergassola, Microscopic Simulation of Complex Hydrodynamic Phenomena, Nato Advanced Study Institute, Alghero, July 15-27, 1991, Nato ASI series, B292, p. 187, 1991.
35. M. Maggiore, S. Succi, F. Papetti, Computing Internal Flows at IBM ECSEC, Proc. of the 3rd ATA Conference on "Innovation and Reliability in Automotive Design and Testing", p. 679-690, Florence, April 1992.
36. Papetti F., Maggiore M., Succi S., Numerical Combustion Applications in an Advanced Computing Environment, Proc. of the 25th ISATA Conference on "Innovation and Reliability in Automotive Design and Testing".
37. M. Maggiore, S. Succi, F. Papetti, Numerical Study of a catalytic converter flow, Proc. of the 25th ISATA Conference on "Innovation and Reliability in Automotive Design and Testing", p. 703.
38. S. Succi, F. Massaioli, R. Benzi, Lattice Boltzmann method for fluid dynamics, 1993 issue of MOTTECC (Modern Techniques in Computational Chemistry), in press
39. S. Succi, Trends in Lattice Boltzmann computing, Proc. Les Houches Winter School on "Turbulence in Spatially Extended Systems", Nova Science Publishers, 1993, p.151.
40. S. Succi, Lattice Boltzmann method: a review with a glance to astrophysics, Proc. Int. Workshop on "Cellular Automata Models: Prospects in Astrophysical Applications", Lieges, Oct. 92, pp. 147, World Scientific (1994).

41. R. Benodekar, R. Issa, M. Maggiore, S. Filippone, S. Succi, Running STAR-CD on a cluster of RS/6000, Proc. 26th ISATA Conference, Aachen, Sept. 1993, p.283-288.
42. Y. Qian, F. Massaioli, S. Succi, S. Orszag, A benchmark for Lattice BGK Model: Flow over a Backward-Facing Step, NATO Workshop on "Pattern Formation and Lattice Gas Automata", Waterloo, Canada, June '93, Fields Inst. Commun., vol. 6, p.207, 1996.
43. F. Dellagiacomma, S. Filippone, S. Succi and M. Bernaschi, STAR-CD on IBM distributed parallel architectures, Basel World CFD User Days '94, 2nd World Conference in Applied Computational Fluid Dynamics, May 1-5 1994, Basel (Switzerland), p. 16 1-10.
44. L. Allocca, F. Corcione, A. Fusco, F. Papetti, S. Succi, Modeling of Diesel Spray Dynamics and Comparison with Experiments, Proc. SAE Conference of Society Automotive Engineers '94, paper n..
45. F. Papetti, S. Succi, Evaluation of the TAB and DDB breakup models for spray combustion Proc. 2nd Conference of the Italian Society for Applied-Industrial Mathematics, p. 385.
46. L. Allocca, F. Corcione, A. Fusco, F. Papetti, S. Succi, Modelling Diesel Spray Dynamic Characteristics, Proc. CROCUS '94 (Combustion Related Organizations Common Unified Symposium), Salsomaggiore, Italy, Sep. 94, paper I7
47. S. Zaleski, J. Li, S. Succi, R. Scardovelli and G. Zanetti, Direct Simulation of flows with interfaces, Keynote lecture at II Int. Conf on Multiphase Flows, Kyoto, April 1995, to appear
48. S. Orszag, Y. H. Qian and S. Succi, Application of Lattice Boltzmann methods to Fluid Dynamics, AGARD Conf. Proceedings 578, Progress and Challenges in CFD Methods and Algorithms, CP-579, 1996, p.25-1.
49. R. Benzi, F. Massaioli, R. Tripicciono, S. Succi, Lattice Boltzmann simulations of Rayleigh-Benard turbulence, Boltzmann Centennial: "The Boltzmann Legacy", Atti Convegno Lincei, 131, 41, 1997.
50. S. Succi, P. Vergari, Lattice Boltzmann extensions for semiconductor simulations, Int Symp. on Comput. Electronics, Phoenix, Oct.'95, to appear in "VLSI Design".
51. M. Bernaschi, F. Papetti, S. Succi, Parallel Combustion on the IBM SP2 platform, Proc. High Performance Computing Symposium, New Orleans, April '96, p. 7.
52. W. Miller and S. Succi, Parallel three-dimensional Lattice Boltzmann Hydrodynamics on the IBM 9076-SP2 Scalable Parallel Computer, Procs. Comput. Fluid Dyn. 96, Desideri et al eds., p.1052, 1996.
53. S. Succi, Parallel computing in industrial environments, Procs. Comput. Meth. in Applied Sciences, Desideri et al eds. p.185, 1996.
54. S. Succi, Lattice Boltzmann Computing of complex flows on massively parallel computers, Procs. II Japan-Italy Symposium on "Flow Problems and phase fields modeling", October 96, Anacapri, Italy.

55. M. Bernaschi, G. Iannello, F. Papetti, S. Succi, Experiences using collective communication in a parallel CFD industrial code, *Parallel CFD '96*, Elsevier p. 127, 1997.
56. G. Amati, S. Succi, R. Piva, R. Benzi, Turbulent channel flow simulations on the Quadrics parallel computer, *Proceedings of Parallel CFD '96*, Elsevier, p.59, 1997.
57. S. Succi, G. Amati, R. Piva, Lattice Boltzmann simulations of Turbulence and Combustion on massively parallel computers, *Procs GAMM 97 Workshop*, Regensburg, March 1997, to appear in *Zeitsch. fur Angewandte Mathematik und Mechanik*.
58. M. Bernaschi, F. Castiglione, S. Succi, Simulating the immune system response on a distributed parallel computer, Venice, Sept. 1997, to appear in *ACM Transactions*.
59. S. Succi, G. Bella, H. Chen, K. Molvig, C. Teixeira, Elimination of fast variables via fictitious lattice dynamics, *Summerschool on "Computer simulations of rare events and the dynamics of classical and quantum condensed phase systems"*, Lerici, July 1997, World Scientific Singapore, p.269, 1998.
60. G. Amati, S. Succi, M. Prospero, R. Piva, Lattice BGK simulation and visualization of three-dimensional turbulent channel flow, *Proceedings of High Performance Computing 98*, A. Tentner ed., Boston, p.1, April 1998.
61. G. Amati, S. Succi, R. Piva, Scaling exponents in channel flow turbulence, *Proceedings 7th European Turbulence Conference*, Cap Ferrat, July 1998, p. 159.
62. F. Toschi, G. Amati, S. Succi, R. Piva, Intermittency in channel flow turbulence, *Proceedings 8th Int. Symp. on Fluid Turbulence*, Monte Verita', March 1998, to appear.
63. M. Bernaschi, S. Succi, F. Castiglione, A parallel simulator of the immune system dynamics, *High Performance Computing Europe*, Amsterdam, March 1998, *Springer Notes in Computer Science*, vol. 1401, p.163, 1998.
64. M. Bernaschi, F. Castiglione, F. Celada, P. Seiden, S. Succi, Simulating the immune systems response, *Europhys. Conf. Abstracts*, Vol. 22F, p.102, 1998
65. M.L. Chiofalo, M.M. Cerimele, F. Pistella, S. Succi, M. Tosi, Numerical study of Bose-Einstein condensates dynamics in optical lattices, March 2000 Meeting of The Am. Phys. Soc., abstract 8.5.xx, to appear
66. F. Mazzocco, G. Amati, S. Succi, Multiscale Lattice Boltzmann schemes for turboaxial machine applications, *Parallel CFD*, Oslo, June 2000.
67. M. Pilotti, A. De Maio, S. Succi, Analisi del campo di moto in mezzi porosi tridimensionali ricostruiti, *IDRA 2000*, XXVII Convegno di Idraulica e Costruzioni Idrauliche, 2000.
68. M. Pilotti, S. Succi, Determinazione numerica della resistenza al moto di una corrente attraverso tenute statiche a labirinto, *AIMETA 2000*, XIII Convegno italiano di Meccanica Computazionale, Brescia, 13-15 Novembre 2000.

69. F. Castiglione, M. Bernaschi, S. Succi, High-performance simulator of the humoral and cellular immune response, High-Performance Computing 2000, Bielefeld, Germany.
70. F. Castiglione, M. Bernaschi, S. Succi, Simulating the immune response on a distributed parallel computer, Proceedings of "Dynamical modeling in Biotechnology", F. Bagnoli, S. Ruffo editors, World Scientific, p.289, 2000.
71. M. Bernaschi, S. Succi, Accelerated lattice Boltzmann schemes for steady-state flow simulations, Europhysics conference abstracts, volume 25H, p. 5, 2001.
72. S. Succi, A. Gabrielli, G. Smith, E. Kaxiras, Reactive microflows with heterogeneous catalysis: a lattice Boltzmann study, Europhysics conference abstracts, volume 25H, p. 57, 2001.
73. S. Succi, O. Filippova, Multiscale lattice Boltzmann methods, Europhysics abstracts, John von Neumann Institute for Computing, volume 8, Invited paper I30, 2001.
74. S. Succi, Kinetic approach to lattice quantum mechanics, 4th ACRI Symposium, Geneva, 2002, Lecture Notes in Computer Science, LNCS 2493, p. 114, Springer Verlag.
75. C. Lowe, S. Succi, Go with the flow lattice Boltzmann methods for tracer dynamics, Int. Symp. on "Bridging the Time-Scale gap", Konstanz, Sept. 2001. Lecture Notes in Physics, LNP 605, p. 267, Springer Verlag, 2002.
76. I. Karlin, A. Ricksen, S. Succi, Dissipative quantum dynamics from Wigner distributions, Proceedings of the 1st Int. Symp. on "Quantum Limits to the Second Law", AIP Proceedings, n. 643, p. 19, (2002).
77. S. Succi, Lattice Boltzmann simulations of thermal microflows with heterogeneous catalysis, ICCS Symposium, St Petersburg, 2003, to appear Lecture Notes in Computer Science, LNCS 2657, p.957, Springer, 2003.
78. A. D'Orazio, S. Succi, Lattice Boltzmann simulations of thermal flows ICCS Symposium, St Petersburg, 2003, to appear Lecture Notes in Computer Science, LNCS 2657, p.977, Springer, 2003.
79. A. Lamura, S. Succi, On the way to a Lattice Boltzmann Model for Glassy Systems?, Proceedings of the International School of Physics "Enrico Fermi" Course CLV, edited by F. Mallamace and H.E. Stanley, IOS Press, Amsterdam, p. 543 (2004)
80. C. Cherubini, F. Federici and S. Succi, Towards a quantitative investigation of sonic black-holes analogies in condensed matter systems, Proceedings of 'Highlights in the quantum theory of condensed matter', edizioni della Normale, vol. 1, p. 131, 2005.
81. S. Orszag, H. Chen and S. Succi, Turbulence effects in kinetic equations, Proceedings of the Symposium in honor of Prof Gottlieb, to appear.
82. S. Succi, Weinan E, E. Kaxiras, Lattice Boltzmann methods for multiscale fluid problems, Handbook of Materials Modelling, Vol. 1: Methods and Modelling, Kluwer, Chapter 8.4, p. 2475-2486, 2005.

83. M. Fyta, S. Melchionna, E. Kaxiras and S. Succi, Multiscale modeling of biopolymer translocation through a nanopore, Seventh Int. Symposium on Computational Science and Simulation, Beijing, China, 2007
84. M. Bernaschi, S. Melchionna, S. Succi, M. Fyta, E. Kaxiras, MUPHY: A parallel High Performance MULTiPHYSics/Scale code, PDSEC08, Orlando, Florida, 2008, accepted
85. S. Melchionna et al, Non-invasive prediction of localization and progression of coronary disease, Meeting of the America Heart Association, June 2008
86. G. Pontrelli et al, Modelling wall shear stress in small arteries using LBM and FVM 2nd Micro and Nanoflow Conference, London, September 2009
87. G. Pontrelli, S. Succi, S. Ubertini Lattice Boltzmann model on unstructured grids with application in hemodynamics, Communications to SIMAI Congress, ISSN 1827-9015, vol.3, (2009), DOI: 10.1685/CSC09XXX
88. A. Peters et al Leveraging theory from cosmodynamics for multi-scale cardiovascular simulation, Int. Symp. on Multiscale Hemodynamics, Lisboa, Sept. 2010

## Dr. Sauro Succi: Internal Reports

- S. Succi, Valutazione dell'efficacia di alcuni algoritmi di controllo per il nocciolo di reattori veloci, CNEN RT-ING 81, 16.
- S. Succi, Finite Elements for Partial Differential Equations: an introductory survey, *International Center for Theoretical Physics, IC/88/63*.
- C. Appert, A. Cancelliere, C. Chang, E. Foti, T. Gustensen, J. Olson, R. Holme, S. Kostek, A. Melayah, D. Rothman, S. Succi, S. Zaleski, G. Zanetti,  
*MIT Porous Project 3*, Massachusetts Institute of Technology, October 1990,
- F. Papetti, S. Succi, G. Ghielmi, KIVA-III studies for Two-stroke Engine Combustion *Study contract, Piaggio-IBM, ECSEC report, May 1994*.
- S. Succi, A six-lecture primer on parallel computing, *Technical Report CS 96-11, Comput. Science Dept, Univ. Chicago, April 1996*.
- S. Succi, H. Chen, C. Teixeira, K. Molvig, F. Gang, Digital combustion: theoretical algorithm specification, *Exa Corporation, Internal Memorandum proj/doc/combustion/007, September 1996*.

### Dr. Sauro Succi: Dissemination Articles

1. S. Succi, P. Santangelo, Automi Cellulari per la Fluidodinamica, Note di Informatica, 15, July 1988, p.15-26.
2. M. Ottaviani, S. Succi Trasporto turbolento in plasmi termonucleari, Note di Informatica, 20, December 1988, p.4-11.
3. G. Boschi, M. Maggiore, M. Ramella, S. Succi, Fluidodinamica computazionale in ambiente industriale, Note di Informatica, 22, March 1990, p.18-26.
4. S. Succi, The Lattice Boltzmann Equation: an innovative tool for computational fluid dynamics, CROSS-CUTS, Rivista del Centro Svizzero Calcolo Scientifico, 1993, p.17.
5. S. Succi, Computational Multiphysics with the Lattice Boltzmann method, SIMU Newsletters, European Center of Atomic and Molecular Computing, May 2001.
6. S. Succi, A. Vulpiani, Moto dei fluidi: Fluidodinamica, Enciclopedia degli Idrocarburi, Edizione Treccani per il cinquantenario ENI, 2004.
7. S. Melchionna, E. Kaxiras, M. Bernaschi and S. Succi, Parallel Multi-Scale Hemodynamics, FLASH, High Performance Computing, F18/2009, 32, (2009).