Personal information

Name / Surname	**Zanlungo Francesco**
Address	700-0927, Okayama-ken, Okayama-shi, Nishi Furu Matsu, 2-11-6, Japan
Telephone	(+81) 0774-95-1561, (+81) 080-4018-2731
Personal Email	zanlungo@atr.jp, francesco.zanlungo@gmail.com
Home page	www.irc.atr.jp/~zanlungo/
Nationality	Italian, **Holder of Japanese permanent residence permit**
Date of birth	10/03/1976
Gender	Male

Research keywords

Complex Systems Modelling, Crowd Behaviour, Simulations, Robotics

Professional experience

October 2022 - Present	Contract consultant Standard AI, San Francisco, US
October 2021 - Present	Contract lecturer Okayama University, Okayama, Japan
April 2021 - Present	Lecturer International Professional University of Technology, Osaka, Japan Permanent position
April 2020 - Present	Part time researcher Okayama University, Okayama, Japan Studying the behaviour of pedestrians and robot-pedestrian interactions
April 2017-March 2020 June 2020-Present	Collaborative researcher Intelligent Robotics and Communication Laboratories, ATR, Kyoto, Japan Studying the behaviour of pedestrians and robot-pedestrian interactions
November 2016-March 2017	Researcher

	Intelligent Robotics and Communication Laboratories, ATR, Kyoto, Japan
	Studying the behaviour of pedestrians and robot-pedestrian interactions
2015-2016	Lecturer in Applied Mathematics
	Kingston University, London, UK
	Faculty of Science, Engineering and Computing, School of Computer Science and Mathematics
	Tenured position, resigned to go back to Japan for family related reasons
2009-2015	Researcher
	Intelligent Robotics and Communication Laboratories, ATR, Kyoto, Japan
	Studying the behaviour of pedestrians and robot-pedestrian interactions
November 2008 and September 2009	Visiting researcher
	CPT (Theoretical Physics Center), Marseilles, France
	Collaboration with Prof. Sandro Vaienti
2008	Instructor
	Milan Polytechnic University
	Teaching Introductory course of Mathematics ("College Algebra")
2007-2009	Post-doctoral researcher
	University of Bologna
	Analysis of the effect of random noise and numerical round-off on discrete maps
June-September 2005	Visiting researcher
	Artificial Life Laboratory at Nagoya University
	Collaboration with Prof. Takaya Arita

Journal editing

From August 2018	Area Editor
	Simulation Modelling Practice and Theory, Elsevier

Professional experience outside research

From 2017	Instructor of conversational Italian language
	Japan-Italy Society of Okayama

Education and training

2004-2007	Ph.D. course
Major	Theoretical Physics
Institution	Graduate school of Physics, University of Bologna, Italy
Graduation Thesis	Microscopic Dynamics of Artificial Life Systems, supervised by Prof. Giorgio Turchetti
2003	Japanese language education
Institution	Yamasa Language school, Okazaki-shi, Aichi-ken, Japan

2002	Italian Laurea in Physics

(The Italian "Laurea" is legally equivalent to a Master degree. To obtain the degree, the candidate was supposed to work on a one year Graduation Thesis project requiring original research.)

Major	Theoretical Physics
Institution	University of Milan, Italy
Graduation Thesis	Studio numerico della cascata ultravioletta nel modello ϕ^4 classico (in Italian), supervised by Prof. Claudio Destri

Languages

Mother tongue   **Italian**

Self-assessment
European level[(*)]

	Understanding		Speaking		Writing
	Listening	Reading	Spoken interaction	Spoken production	
English	C2 Proficient user	C2 Proficient user	C2 Proficient user	C2 Proficient user	C2 Proficient user
Japanese(**)	C1 Proficient user	C1 Proficient user	C1 Proficient user	C1 Proficient user	C1 Proficient user
Spanish	C2 Proficient user	C2 Proficient user	C1 Proficient user	C1 Proficient user	C1 Proficient user
Portuguese	C1 Proficient user	C1 Proficient user	B2 Independent user	B2 Independent user	B1 Independent user
French	B2 Independent user	C1 Proficient user	B1 Independent user	B1 Independent user	A2 Basic user
Turkish	A2 Basic user	A2 Basic user	A2 Basic user	A1 Basic user	A2 Basic user
Mandarin Chinese	A1 Basic user	A2 Basic user	A1 Basic user	A1 Basic user	A2 Basic user

[(*)]*Common European Framework of Reference* (CEF) level

[(**)]*Holder of first (highest) level of Japanese proficiency, approved in 2008*

External funding

2022-	Collaborative researcher in the Advanced Mathematical Science for Mobility Society of Kyoto University (Unit leader: Prof S. Tsujimoto)
2021	Collaborative researcher in the JSPS Kiban-A 18H04121 project *Research and development for mobile HRI and its interaction design theory* (Principal investigator T. Kanda)

Granted by the Japan Society for the Promotion of Science

Budget 2M Japanese Yen

2016	I was, along with two colleagues, part of the Kingston University team that prepared the proposal for the H2020 EU "Monica" project, to which 26 European universities, research centres, industries and public institutions participated. The project has been approved with a budget of 15 million euros, 1 million of them corresponding to the Kingston University unit.

Awards

2016	Awarded a Kingston University Mres studentship (i.e., a fund for a Master student)

Experience in event organisation

2006-2009	In-chief of the organising committee

The Italian workshop on Biophysics (Biophys'06-09), held annually in Arcidosso, Grosseto, Italy.

Computer skills

C, C++, Fortran, Matlab, Mathematica

MS Office, HTML

Latex

Additional information

Home page	www.irc.atr.jp/~zanlungo/

Driving licence(s)	B (cars)
Personal interests	Foreign languages, swimming, running, cycling, basketball, traveling, music, digital photography, books in general, my family.

Teaching experience

From 2021	Contract Lecturer at Okayama University, Okayama, Japan
	Teaching "Mechanics" (in Japanese)
From 2021	Lecturer at the International Professional University of Technology, Osaka, Japan
	Teaching courses in "Linear Algebra" (in Japanese, starting from 2021/9), "Probability and Statistics" (in Japanese, starting from 2022/4) and Scientific English (starting from 2023/4)
In 2018	Contract Lecturer at Okayama University, Okayama, Japan
	Teaching "Global Studies II"
2016-2017 (Appointed, and prepared lecture notes, before resigning)	Applications of Calculus, Partial Differential Equations module, School of Computer Science and Mathematics, Kingston University
	This undergraduate course introduced the theory of Linear Partial Differential Equations. The course started with an introduction to the geometrical meaning of vector calculus leading to the expression of the Laplace operator in the principal curvilinear coordinate systems. Then the Heat, Wave, Poisson and Schrödinger equations were introduced, along with separation of variables solutions in Cartesian and spherical coordinates.
Course notes	https://www.dropbox.com/s/ja2arlaweqycn8b/notes_prova.pdf?dl=0
2015-2016	Mathematical and Numerical Methods, Numerical Linear Algebra module, School of Computer Science and Mathematics, Kingston University
	This undergraduate course revised the main theoretical concepts of linear algebra (linear systems, vector space, linear operators, vector and matrix norm, contraction theorem, eigenvalues and eigenvectors, matrix diagonalisation), and introduced numerical algorithms for the solution of related problems (Gaussian Elimination, LU decomposition, iterative methods, eigenvalue power method).
Course notes	https://www.dropbox.com/s/z7d28niwldy734m/notes.pdf?dl=0
2015-2016	Mathematical Models and Computation, Programming module, School of Computer Science and Mathematics, Kingston University
	This undergraduate course introduced the fundamental sorting and search algorithms, along with the theoretical concepts necessary for their analysis (algorithm complexity). Part of the course was directed to practical exercitations aimed at acquiring the abilities for performing scientific programming.
2015-2016	Engineering Mathematics and Computing, School of Civil Engineering, Kingston University
	This undergraduate course revised the fundamental concepts of applied calculus (up to ordinary differential equations) and taught how to solve the related problems by Matlab.
2008-2009	Analytical Mechanics, Instructed by Prof. Turchetti and F. Zanlungo, Dep. of Physics, Bologna University
	This course was focused on a throughout analysis of Lagrangian Mechanics (Lagrange equations, symmetries, central field, two body problem, stability, small oscillations, rigid body) and a solid introduction to Hamiltonian dynamics (Hamilton equations, canonical transformations, Noether theorem, integrable systems, Liouville theorem, ergodicity). My task on the course was to give part of the theoretical classes.
2008-2009	Teaching assistant of the Institutions of Mathematics course, Instructed by Prof. Bazzani, Milan Polytechnic University
	An introductory calculus course, focused in particular on the concepts of real numbers, functions, limits and derivation, along with some notions of linear algebra. My task on the course was to give some theoretical classes in absence of Prof. Bazzani, hold practice sessions and prepare examination tests.
2008	Introductory course of Mathematics ("College Algebra"), Milan Polytechnic University

A course intended for those students that passed the University entry exam but scored poorly in mathematics, focused mainly on the concept of elementary real functions.

2007-2008   Teaching assistant of the Numerical Methods course, Instructed by Profs. Turchetti and Bazzani, Master course in Physics, Bologna University

This course was focused on an introduction of numerical methods for physical sciences (interpolation, numerical solution of non linear equations, numerical integration, numerical solution of differential equations, stochastic systems). My task on the course was to give a few theoretical classes and to assist students during practice sessions.

2007-2008   Teaching assistant of the Complex Systems Laboratory course, Instructed by Dr. Giorgini, Dep. of Physics, Bologna University

For this course, I prepared lectures on genetic algorithms, population dynamics (evolutionary game theory) and neural networks.

Research experience

Crowd dynamics

Mathematical modelling of pedestrian behaviour, crowd dynamics and group behaviour, in collaboration with T. Kanda

In ATR we collected a large amount of data concerning the behaviour of pedestrians in experimental settings and in real world environments, which I used to develop original models of pedestrian and crowd dynamics. More in detail, the major findings regarded:

1. The need to include a velocity dependent potential in a collision avoiding model for pedestrians, and the development of a corresponding mathematical and computational model [15].

2. The improvement of the above model by taking in account the asymmetrical shape of human bodies [3], an analysis based on the dynamics of cross-flows [2,23].

3. The development of "Congestion Number", a mathematical tool to asses the state of a human pedestrian crowd [1,25], *(in collaboration with the Nishinari lab. of Tokyo University)*

4. The tendency of (Japanese) pedestrians to walk on the left side of corridors, and to overtake other pedestrians on the right side, and the development of a method to introduce in a realistic way such a tendency in any pedestrian collision avoidance model [14,43].

5. Large pedestrian groups are not stable, and usually break up in more stable 2 or 3 pedestrian sub-units [41].

6. A mathematical model for the behaviour of social pedestrian groups, which was able to correctly predict the shape and velocity of pedestrian groups in low density, large environments [12].

7. Empirical study and mathematical modelling of how crowd density and other environment features affect the behaviour of pedestrians and in particular of groups [9,10,39,40].

8. How group composition and social roles affect the behaviour of pedestrian groups, and how this information may be used to automatically recognise groups and their composition [4,5,8,24,26,28,31,32,38].

9. How gestures affect the behaviour of pedestrian groups [7,34].

10. How the presence of groups affects crowd dynamics [29]

Human-Robot interaction

Socially acceptable mobile robot navigation, in collaboration with T. Kanda

While working at ATR I have been also involved in more engineering oriented works, such as the development of a robot able to smoothly navigate inside a human crowd [11,27,33,35,44,46], and the development of algorithms to automatically detect pedestrian walking goals [42] and pedestrian groups [13,36,45].

Discrete chaotic systems

Analysis of the effect of noise on discrete maps, in collaboration with S. Vaienti and G. Turchetti

Development of a method to find a threshold beyond which the numerical results on chaotic maps are not reliable, and analysis of the differences between the effect of random noise and the effect of numerical round-off on the dynamics of the map [16,17,18].

Evolutionary dynamics of agent systems	*Microscopic Dynamics of Artificial Life Systems (Ph.D. thesis, sup. G. Turchetti, in collaboration with T. Arita)*

Using an approach combining cellular automata or agent models with differential equation (replicator dynamics) models, I studied:

1. The Immune System T cell clonal expansion **[22]**.

2. The relation between the evolution of collision avoidance strategies and the evolution of a *Theory of Mind* **[21,48,49]**.

3. The evolution of "traffic conventions" (such as driving on the left or right side of streets) in a mobility system **[19,50]**.

4. The consequences of the fact that interactions dependent on vision (such as the collision avoidance in crowd dynamics) do not follow the action-reaction law of dynamics **[20,30]**.

Numerical study of statistical properties of relativistic fields	*Numerical study of the ultraviolet cascade in ϕ^4 classical model (Master thesis, sup. C. Destri)*

Using a numerical algorithm that treats time and space in a symmetrical way, preserving thus the relativistic structure of the field theory, and conserving energy at machine precision, I studied the energy diffusion to the higher (ultraviolet) modes of a relativistic scalar field with a quartic interaction term. The results were compared with a more traditional numerical treatment of hyperbolic partial differential equations.

Publications

Journal papers and book chapters

1   F. Zanlungo, C. Feliciani, Z. Yücel, X. Jia, K. Nishinari, T. Kanda
A pure number to assess "congestion" in pedestrian crowds
Transportation Research Part C: Emerging Technologies 148, 104041, 2023
https://doi.org/10.1016/j.trc.2023.104041 **(2022 impact factor 9.021)**

2   F. Zanlungo, C. Feliciani, Z. Yücel, K. Nishinari, T. Kanda
Macroscopic and microscopic dynamics of a pedestrian cross-flow: Part II, modelling
Safety Science 158, 105969, 2023
https://doi.org/10.1016/j.ssci.2022.105969 **(2022 impact factor 6.392)**

3   F. Zanlungo, C. Feliciani, Z. Yücel, K. Nishinari, T. Kanda
Macroscopic and microscopic dynamics of a pedestrian cross-flow: Part I, experimental analysis
Safety Science 158, 105953, 2023
https://doi.org/10.1016/j.ssci.2022.105953 **(2022 impact factor 6.392)**

4   F. Zanlungo, Z. Yücel, T. Kanda
Intrinsic group behaviour II: On the dependence of triad spatial dynamics on social and personal features; and on the effect of social interaction on small group dynamics
PloS One, Vol 14, No 12, pp e0225704, 2019
doi: 10.1371/journal.pone.0225704 **(impact factor 2.776)**

5   Z. Yücel, F. Zanlungo, C. Feliciani, Claudio, A. Gregorj, T. Kanda
Identification of social relation within pedestrian dyads
PloS One, Vol 14, No 10, pp e0223656, 2019
doi: 10.1371/journal.pone.0223656 **(impact factor 2.776)**

6   39 authors including F. Zanlungo
A Glossary for Research on Human Crowd Dynamics
Collective Dynamics, Vol. 4, pp. 1-13, 2019
doi: 10.17815/CD.2019.19

7   Z. Yücel, F. Zanlungo and M. Shiomi
Modeling the impact of interaction on pedestrian group motion
Advanced Robotics, Vol. 32, No 3, pp. 137-147, 2018 **(impact factor 0.92)**
doi: 10.1080/01691864.2017.1421481

8   F. Zanlungo, Z. Yücel, D. Brščić, T. Kanda, N. Hagita
Intrinsic group behaviour: dependence of pedestrian dyad dynamics on principal social and personal features
Plos One 0187253, 2017 **(impact factor 3.54)**
doi: 10.1371/journal.pone.0187253

9   F. Zanlungo, T. Kanda
A mesoscopic model for the effect of density on pedestrian group dynamics
Europhysics Letters, Vol. 111, No 3, pp. 38007, 2015 **(impact factor 2.095)**
doi: 10.1209/0295-5075/111/38007

10   F. Zanlungo, D. Brščić, T. Kanda
Spatial-size scaling of pedestrian groups under growing density conditions

Physical Review E Vol. 91 No 6, pp. 062810, 2015 **(impact factor 2.288)**
doi: 10.1103/PhysRevE.91.062810

11   M. Shiomi, F. Zanlungo, K. Hayashi , T. Kanda
Towards a Socially Acceptable Collision Avoidance for a Mobile Robot Navigating Among Pedestrians Using a Pedestrian Model
International Journal of Social Robotics, Vol. 6, No 3, pp 443-455, 2014 **(impact factor 1.207)**
doi: 10.1007/s12369-014-0238-y

12   F. Zanlungo, T. Ikeda, T. Kanda
Potential for the dynamics of pedestrians in a socially interacting group
Physical Review E Vol. 89, No 1, pp. 012811, 2014 **(impact factor 2.288)**
doi: 10.1103/PhysRevE.89.012811
(Paper chosen as "editor suggestion", i.e. as being of particular clarity and importance)

13   Z. Yücel, F. Zanlungo, T. Ikeda, T. Miyashita, N. Hagita
Deciphering the crowd: Modeling and identification of pedestrian group motion
Sensors, Vol. 13, No. 1, pp. 875-897, 2013 **(impact factor 1.953)**
doi: 10.3390/s130100875

14   F. Zanlungo, T. Ikeda, T. Kanda
A microscopic social norm model to obtain realistic macroscopic velocity and density pedestrian distributions
PLoS ONE Vol. 7, No 12, pp. e50720, 2012 **(impact factor 3.73)**
doi: 10.1371/journal.pone.0050720

15   F. Zanlungo, T. Ikeda, T. Kanda
Social force model with explicit collision prediction
Europhysics Letters, Vol. 93, No. 6, pp. 68005, 2011 **(impact factor 2.171)**
doi: 10.1209/0295-5075/93/68005

16   G. Turchetti, S. Vaienti and F. Zanlungo
Asymptotic distribution of global errors in the numerical computations of dynamical systems
Physica A, Vol. 389, No 21, pp. 4994-5006, 2010 **(impact factor 1.521)**
doi: 10.1016/j.physa.2010.06.060

17   G. Turchetti, S. Vaienti and F. Zanlungo
Relaxation to the asymptotic distribution of global errors due to round off
Europhysics Letters, Vol. 89, No 4, pp. 40006, 2010 **(impact factor 2.753)**
doi: 10.1209/0295-5075/89/40006

18   P. Marie, G. Turchetti, S. Vaienti and F. Zanlungo
Error distribution in randomly perturbed orbits
Chaos: An Interdisciplinary Journal of Nonlinear Science, Vol. 19, No 4, pp. 043118, 2009 **(impact factor 1.795)**
doi: 10.1063/1.3267510

19   F. Zanlungo, T. Arita, S. Rambaldi
Emergence of a traffic flow convention in a multiagent model
Advances in Complex Systems. Vol. 11, No 5, pp. 789-802, 2008
doi: 10.1142/S0219525908001921

20   G. Turchetti, F. Zanlungo, B. Giorgini
Dynamics and thermodynamics of a gas of automata

Europhysics Letters, Vol. 78, No 5, pp. 58003, 2007 **(impact factor 2.206)**
doi: 10.1209/0295-5075/78/58003

21 | F. Zanlungo
A collision avoiding mechanism based on a theory of mind
Advances in Complex Systems. Vol. 10 suppl. No. 2, pp. 363-371, 2007
doi: 10.1142/S0219525907001410

Book chapters

22 | F. Zanlungo, G. Turchetti, S. Rambaldi
An Automata Based Microscopic Model Inspired by Clonal Expansion
Mathematical Modeling of Biological Systems, Volume II. A. Deutsch et al. (eds.), Birkhäuser, Boston,
pp. 133-144, 2008
doi: 10.1007/978-0-8176-4556-4_12

Conference papers

23 | F. Zanlungo, C. Feliciani,H. Murakami, Z. Yücel, X. Jia, K. Nishinari, T. Kanda
Density dependence of stripe formation in a cross-flow
International Conference on Traffic and Granular Flow (TGF 2022)
15-17 October 2022, Delhi, India

24 | A. Gregorj, Z. Yčel, F. Zanlungo, T. Kanda
On the influence of group social interaction on intrusive behaviors
International Conference on Traffic and Granular Flow (TGF 2022)
15-17 October 2022, Delhi, India

25 | F. Zanlungo, C. Feliciani, Z. Yčel, K. Nishinari, T. Kanda
Crowd congestion number
Pedestrian and Evacuation Dynamics, PED 2021
Dec 2021, Melbourne, Australia

26 | A. Gregorj, Z. Yčel, F. Zanlungo, C. Feliciani, T. Kanda
On the influence of group social relation on the dynamics of pedestrians outside the group
Pedestrian and Evacuation Dynamics, PED 2021
Dec 2021, Melbourne, Australia

27 | E. Repiso, F. Zanlungo, T. Kanda, A. Garrell, A. Sanfeliu
People's V-Formation and Side-by-Side Model Adapted to Accompany Groups of People by Social Robots
International Conference on Intelligent Robots and Systems 2019, pp. 2082-2088
Nov 4-8 2019, Macau, China
doi: 10.1109/IROS40897.2019.8968601

28 | Z. Yücel, F. Zanlungo, T. Kanda
Gender profiling of pedestrian dyads
Traffic and Granular Flow Conference 2019, pp. 299-305
July 2-5 2019, Pamplona, Spain
doi: 10.1007/978-3-030-55973-1_37

29 | F. Zanlungo, L. Crociani, Z. Yücel, T. Kanda
The effect of social groups on the dynamics of bi-directional pedestrian flow: a numerical study
Traffic and Granular Flow Conference 2019, pp. 307-313
July 2-5 2019, Pamplona, Spain
doi: 10.1007/978-3-030-55973-1_38

30 | C. Feliciani, F. Zanlungo, K. Nishinari, T. Kanda
Thermodynamics of a gas of pedestrians: Theory and experiment

Pedestrian and Evacuation Conference 2018
Collective Dynamics, Vol 5, pp. 440-447, 2020
Aug 21-24 2018, Lund, Sweden
doi: 10.17815/CD.2020.97

31   Z. Yücel, F. Zanlungo, C. Feliciani, T. Kanda
      Estimating social relation from trajectories
      Pedestrian and Evacuation Conference 2018
      Collective Dynamics, Vol 5, pp. 222-229, 2020
      Aug 21-24 2018, Lund, Sweden
      doi: 10.17815/CD.2020.54

32   F. Zanlungo, Z. Yücel, T. Kanda
      Social group behaviour of triads. Dependence on purpose and gender
      Pedestrian and Evacuation Conference 2018
      Collective Dynamics, Vol 5, pp. 118-125, 2020
      Aug 21-24 2018, Lund, Sweden
      doi: 10.17815/CD.2020.90

33   F. Zanlungo, Z. Yücel, F. Ferreri, J. Even, L.Y. Morales Saiki, T. Kanda
      Pedestrian models for robot motion
      Pedestrian and Evacuation Conference 2018
      Collective Dynamics, Vol 5, pp. 525-527, 2020
      Aug 21-24 2018, Lund, Sweden
      doi: 10.17815/CD.2020.90

34   Z. Yücel, F. Zanlungo and M. Shiomi
      Walk the talk: Gestures in mobile interaction
      International Conference on Social Robotics 2017, pp. 220-230
      Nov 22-24 2017, Tsukuba, Japan
      doi: 10.1007/978-3-319-70022-9_22

35   F. Zanlungo, Z. Yücel, F. Ferreri, J. Even, L.Y. Morales Saiki, T. Kanda
      Social group motion in robots
      International Conference on Social Robotics 2017, pp. 474-484, Tsukuba, Japan
      doi: 10.1007/978-3-319-70022-9_47

36   D. Brščić, F. Zanlungo, T. Kanda
      Modelling of Pedestrian groups and application to group recognition
      40th International Convention on Information Information and Communication Technology, Electronics
      and Microelectronics (MIPRO), 2017, pp. 564-569, Opatija, Croatia
      doi: 10.23919/MIPRO.2017.7973489

37   K. Kamei, F. Zanlungo, T. Kanda, Y. Horikawa, T. Miyashita, N. Hagita
      *Cloud networked robotics for social robotic services extending robotic functional service standards to
      support autonomous mobility system in social environments*
      International Conference on Ubiquitous Robots and Ambient Intelligence (URAI), 2017, pp. 897-902,
      Jeju, South Korea
      doi: 10.1109/URAI.2017.7992862

38   F. Zanlungo, Z. Yücel, T. Kanda
      The effect of social roles on group behaviour
      Pedestrian and Evacuation Conference 2016, pp. 243-249, Hefei, China
      doi: 10.17815/CD.2016.11

39	F. Zanlungo, D. Brščić, T. Kanda *Pedestrian group behaviour analysis under different density conditions* Pedestrian and Evacuation Conference 2014, Delft, Netherlands Transportation Research Procedia Vol. 2, 149-158, 2014 doi: 10.1016/j.trpro.2014.09.020
40	D. Brščić, F. Zanlungo, T. Kanda *Density and velocity patterns during one year of pedestrian tracking* Pedestrian and Evacuation Conference 2014, Delft, Netherlands Transportation Research Procedia 2, 77-86, 2014 doi: 10.1016/j.trpro.2014.09.011
41	F. Zanlungo, T. Kanda *Do walking pedestrians stably interact inside a large group? Analysis of group and sub-group spatial structure* The annual meeting of cognitive science society (CogSci) 2013, Vol. 35, No. 35, pp. 3847-3852, Berlin, Germany
42	T. Ikeda, Y. Chigodo, D. Rea, F. Zanlungo, M. Shiomi, T. Kanda *Modeling and Prediction of Pedestrian Behavior based on the Sub-goal Concept* Robotics: Science and Systems (RSS) 2013, pp. 137-144, Sidney, Australia (acceptance rate 33%) doi: 10.15607/RSS.2012.VIII.018
43	F. Zanlungo, Y. Chigodo, T. Ikeda, T. Kanda *Experimental study and modelling of pedestrian space occupation and motion pattern in a real world environment* Pedestrian and Evacuation Dynamics 2012, Zurich, Switzerland Weidmann et al. (eds.), pp. 289-304, Springer, (published as a book in 2014) doi: 10.1007/978-3-319-02447-9_24
44	M. Shiomi, F. Zanlungo, K. Hayashi, T. Kanda *A Framework with a Pedestrian Simulator for Deploying Robots into a Real Environment* International Conference on Simulation, Modeling, and Programming for Autonomous Robots 2012 (SIMPAR), pp. 185-196, (acceptance rate 35%) doi: 10.1007/978-3-642-34327-8_19
45	Z. Yücel, F. Zanlungo, T. Ikeda, T. Miyashita, N. Hagita *Modeling Indicators of Coherent Motion* International Conference on Intelligent Robots and Systems (IROS) 2012, pp 2134–2140, Algarve, Portugal (acceptance rate 39%) 2012 doi: 10.1109/IROS.2012.6385744
46	M. D. Cooney, F. Zanlungo, S. Nishio, H. Ishiguro *Designing a Flying Humanoid Robot (FHR): Effects of Flight on Interactive Communication* International Symposium on Robot and Human Interactive Communication (IEEE RO-MAN) 2012, pp. 364-371, 2012, Paris, France doi: 10.1109/ROMAN.2012.6343780
47	A. Bazzani, B. Giorgini, F. Zanlungo and S. Rambaldi *Cognitive Dynamics in an automata gas* Artificial Life and Evolutionary Computation, pp. 3-19, Wivace 2008, Venice, Italy doi: 10.1142/9789814287456_0001

48	F. Zanlungo *Evolution of high level recursive thinking in a collision avoiding agent model* Artificial Life and Evolutionary Computation, pp. 155-164, Wivace 2008, Venice, Italy doi: 10.1142/9789814287456_0014
49	F. Zanlungo, A. Bazzani, B. Giorgini, S. Rambaldi, G. Servizi and G. Turchetti *An evolutionary crowd dynamics model* European Conference on Complex Systems 2007, Dresden Germany
50	F. Zanlungo, T. Arita *Evolutionary Simulation of an Agent Based Mobility System Using Indirect Communication* International Symposium of Artificial Life and Robotics (A-Life) 2006, pp. 319-322, Oita, Japan

Other presentations at conferences

51	F. Zanlungo, Z. Yücel, F. Ferreri, J. Even, L.Y. Morales Saiki, T. Kanda *Autonomous vehicles moving as a human group* Poster presentation at IROS 2017
52	F. Zanlungo, G. Turchetti *Dynamics and Thermodynamics of Automata with a visual cone. Comparison with a recursive thinking model* Dynamics and Thermodynamics of Systems with Long Range Interactions: Theory and Experiments, 2007
53	F. Zanlungo, G. Turchetti *An evolutionary collision avoiding model based on the theory of mind* International Conference on the Simulation of adaptive behavior (SAB) 2006, Rome, Italy
54	F. Zanlungo, G. Turchetti *Dynamics and thermodynamics of a gas of automata* Italian Workshop in Artificial Life (WIVA3), 2006
55	G. Turchetti, F. Zanlungo *Termodinamica di un gas di automi (in Italian)* Italian Workshop in Artificial Life (WIVA2), 2005, Rome, Italy
56	G. Turchetti, S. Rambaldi, G. Salustri and F. Zanlungo *Mathematical models of clonal expansion* WSEAS Transactions on Biology and Biomedicine 1, 373-378, 2004

Invited talks

57	*Pedestrian models: current state and perspectives* Kyoto University Kyoto, Japan, 2019
58	*Pedestrian group behaviour* Kyoto University Kyoto, Japan, 2019
59	*Pedestrian group behaviour* Alicante University Alicante, Spain, 2019

Japanese language papers

75 | 林宏太郎、塩見昌裕、Francesco ZANLUNGO、神田崇行
歩行者モデルを用いた話しかけやすい移動行動
日本ロボット学会第３２回学術講演会講演論文集RJS2014, 3P2-07, 2014

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Patents

Registered patents

1 | T. Ikeda, F. Zanlungo, T. Miyashita, T. Kanda
System for the prediction of pedestrian motion and robot control
（移動予測装置、ロボット制御装置、移動予測プログラムおよび移動予測方法）
Japanese patent 5763384, registered on 19/6/2015

2 | M. Shiomi, T. Kanda, F. Zanlungo, T. Ikeda
A robot able to predict pedestrian motion and perform automatic collision avoidance
（歩行者の軌跡を予測して自己の回避行動を決定するロボット）
Japanese patent 5768273, registered on 3/7/2015