

# Contents

## Part I   Keynotes

<b>Automatic Detection and Tracking of Pedestrians in Videos with Various Crowd Densities .....</b>	<b>3</b>
Afshin Dehghan, Haroon Idrees, Amir Roshan Zamir, and Mubarak Shah	
<b>London Bridge: The Role Pedestrian Modelling Played in Designing the New Station .....</b>	<b>21</b>
Nicolas Le Glatin, Isabelle Milford, and Andrew Hutton	
<b>Mass Psychology Revisited: Insights from Social Psychology, Neuroscience and Simulation .....</b>	<b>39</b>
Thomas Brudermann	
<b>Shaping the Space: Turning Function into Inspiration .....</b>	<b>55</b>
Peter Jenkins	
<b>Simple Heuristics and the Modelling of Crowd Behaviours.....</b>	<b>75</b>
Mehdi Moussaïd and Jonathan D. Nelson	
<b>The Characteristics and Needs of Pedestrians with Mobility Impairments .....</b>	<b>91</b>
Marjolein de Jong	

## Part II   Experiment and Evacuation

<b>An Evacuation Validation Data Set for Large Passenger Ships.....</b>	<b>109</b>
Edwin Richard Galea, Steven Deere, Robert Brown, and Lazaros Filippidis	
<b>An Information Processing Based Model of Pre-evacuation Behavior for Agent Based Egress Simulation .....</b>	<b>125</b>
Vaisagh Viswanathan and Michael Lees	

<b>An Innovative Evacuation System for Multiplex Cinemas .....</b>	<b>135</b>
Athanasios Kosmopoulos and Stavros Katsoulis	
<b>An Innovative Scenario for Pedestrian Data Collection: The Observation of an Admission Test at the University of Milano-Bicocca .....</b>	<b>143</b>
Mizar Luca Federici, Andrea Gorrini, Lorenza Manenti, and Giuseppe Vizzari	
<b>Trajectory Analysis of Pedestrian Crowd Movements at a Dutch Music Festival .....</b>	<b>151</b>
Dorine C. Duives, Winnie Daamen, and Serge Hoogendoorn	
<b>An Experimental Study on the Correlation Between “Attachment to Belongings” “Pre-movement” Time.....</b>	<b>167</b>
Marco D’Orazio and Gabriele Bernardini	
<b>Bottlenecks in Evacuation Design Considering Both Structural and Human Behavioural Aspects: An Experimental Study .....</b>	<b>179</b>
Tuomo Rinne, Timo Korhonen, and Peter Grönberg	
<b>Comparison of Evacuation Simulation Models .....</b>	<b>189</b>
Burkhard Forell, Hubert Klüpfel, Volker Schneider, and Sören Schelter	
<b>Crowd Guidance in Building Emergencies: Using Virtual Reality Experiments to Confirm Macroscopic Mathematical Modeling of Psychological Variables.....</b>	<b>197</b>
Kerry L. Marsh, Christian T. Wilkie, Peter B. Luh, Zhenxiang Zhang, Timothy Gifford, and Neal Olderman	
<b>Development of Smoke Control System Ensuring Safe Evacuation Through Stairwell for High-Rise Building in Korea .....</b>	<b>213</b>
Jung-Yup Kim, Hyun-Joon Shin, and Ji-Seok Kim	
<b>Early-Stage Egress Simulation for Process-Driven Buildings.....</b>	<b>223</b>
Gabriel Wurzer	
<b>Effect of Guidance Information and Human Relations Among Agents on Crowd Evacuation Behavior.....</b>	<b>231</b>
Masaru Okaya and Tomochi Takahashi	
<b>Empirical Fundamental Diagrams for Bidirectional Pedestrian Streams in a Corridor .....</b>	<b>245</b>
J. Zhang, A. Schadschneider, and A. Seyfried	
<b>Empirical Study and Modelling of Pedestrians’ Route Choice in a Complex Facility .....</b>	<b>251</b>
Armel Ulrich Kemloh Wagoum, Armin Seyfried, Frank Fiedrich, and Ralph Majer	

<b>Evacuation Analyses for Venues</b> .....	267
Sven Hebben, Patrick Gessler, and Hubert Klüpfel	
<b>Influence of Spreading Hazardous Material in Macroscopic Evacuation Dynamics: A Proof of Concept</b> .....	275
Simone Göttlich, Sebastian Kühn, Jan Peter Ohst, and Stefan Ruzika	
<b>Evacuation Exercises in a TV Studio</b> .....	283
Patrick Gessler and Sven Hebben	
<b>Experimental Study and Modelling of Pedestrian Space Occupation and Motion Pattern in a Real World Environment</b> .....	289
F. Zanlungo, Y. Chigodo, T. Ikeda, and T. Kanda	
<b>Experimental Study of the Following Dynamics of Pedestrians</b> .....	305
C. Appert-Rolland, A. Jelic, P. Degond, J. Fehrenbach, J. Hua, A. Cretual, R. Kulpa, A. Marin, A.-H. Olivier, S. Lemercier, and J. Pettre	
<b>FDS+Evac Model Validation for Seated Row Arrangements: Aircraft and Cinema Theatre</b> .....	317
K. Naveesh Reddy, A.K. Babbar, and Timo Korhonen	
<b>Fundamental Diagram of Stairs: Critical Review and Topographical Measurements</b> .....	329
Sebastian Burghardt, Armin Seyfried, and Wolfram Klingsch	
<b>Hermes: An Evacuation Assistant for Large Arenas</b> .....	345
Stefan Holl, Andreas Schadschneider, and Armin Seyfried	
<b>Influence of Emissions on Pedestrian Evacuation</b> .....	351
Hermann Mayer, Dirk Hartmann, Wolfram Klein, and Oliver Zechlin	
<b>Large-Scale Multi-modal Evacuation Analysis with an Application to Hamburg</b> .....	361
Dirk Durst, Gregor Lämmel, and Hubert Klüpfel	
<b>Measuring Individual's Egress Preference in Wayfinding Through Virtual Navigation Experiments</b> .....	371
Jan Dijkstra, Qunli Chen, Bauke de Vries, and Joran Jessurun	
<b>Modelling Evacuation Using Escalators: A London Underground Dataset</b> .....	385
Michael J. Kinsey, Edwin R. Galea, and Peter J. Lawrence	
<b>Observations from Student Exercises to Collect Human Behavior and Movement Data</b> .....	401
Majed Almejmaj and Brian J. Meacham	

<b>On Measuring Pedestrian Density and Flow Fields in Dense as well as Sparse Crowds .....</b>	<b>411</b>
Matthias Plaue, Günter Bärwolff, and Hartmut Schwandt	
<b>On the Simulation for Rail Tunnel Evacuation with Cross-Passageways .....</b>	<b>425</b>
S.B. Liu, S.M. Lo, and J. Ma	
<b>Pedestrian-Vehicles Interaction During Evacuation: Agent-Based Hybrid Evacuation Modelling of Southeast Asian Cities .....</b>	<b>435</b>
Manuela Di Mauro, Michael Lees, Kusnowidjaja Megawati, and Zhenhua Huang	
<b>PedGo Guardian: Evacuation Decision Support System for Events .....</b>	<b>445</b>
H. Klüpfel and T. Meyer-König	
<b>RiMEA: A Way to Define a Standard for Evacuation Calculations .....</b>	<b>455</b>
Christian Rogsch, Hubert Klüpfel, Rainer Könnecke, and Andreas Winkens	
<b>Simulation Model of Evacuation Behavior Following a Large-Scale Earthquake that Takes into Account Various Attributes of Residents and Transient Occupants .....</b>	<b>469</b>
Toshihiro Osaragi, Takayuki Morisawa, and Takuya Oki	
<b>Simulation of City Evacuation Coupled to Flood Dynamics .....</b>	<b>485</b>
A.S. Mordvintsev, V.V. Krzhizhanovskaya, M.H. Lees, and P.M.A. Slood	
<b>Large Scale Outdoor Events .....</b>	<b>501</b>
Hubert Klüpfel and Sven Hebben	
<b>The Study on the Effects of the Counter-Flow on the Evacuation of People from Tall Buildings .....</b>	<b>509</b>
Piotr Tofilo, Marcin Cisek, and Krzysztof Lacki	
<b>Study of Human Behavior Before Evacuation .....</b>	<b>521</b>
Tao Chen, Lili Pan, and Guoquan Zhang	
<b>Tracking People in Crowded Scenes .....</b>	<b>533</b>
Maik Boltes and Armin Seyfried	
<b>Validation and Calibration of the EXIT89 Evacuation Model for Road Tunnel Evacuation Applications .....</b>	<b>543</b>
Enrico Ronchi, Rita Fahy, Pasquale Colonna, and Nicola Berloco	
<b>Waiting Zones for Real Life Scenarios: A Case Study Using a German Railway Station as an Example .....</b>	<b>551</b>
Maria Davidich, Florian Wilhelm Geiss, Hermann Mayer, Alexander Pfaffinger, and Christian Royer	

### Part III Simulation and Modeling

<b>A Data-Driven Model of Pedestrian Following and Emergent Crowd Behavior</b> .....	561
Kevin Rio and William H. Warren	
<b>A Macroscopic Model for Bidirectional Pedestrian Flow</b> .....	575
Cécile Appert-Rolland, Pierre Degond, and Sébastien Motsch	
<b>A Macroscopic Multiple Species Pedestrian Flow Model Based on Heuristics Implemented with Finite Volumes</b> .....	585
Frank Huth, Günter Bärwolff, and Hartmut Schwandt	
<b>Quantitative Validation of the Generalized Centrifugal Force Model</b> ...	603
Mohcine Chraïbi, Armin Seyfried, and Andreas Schadschneider	
<b>An Econometric-based Model of Pedestrian Walking Behavior Implicitly Considering Strategic or Tactical Decisions</b> .....	615
Daisuke Fukuda, Toru Seo, Kaoru Yamada, Hideki Yaginuma, and Nobuhiro Matsuyama	
<b>An Empirically-Grounded Emergent Approach to Modeling Pedestrian Behavior</b> .....	625
Stephane Bonneaud and William H. Warren	
<b>Calibrating a General Pedestrian Stream Simulation Model According to a Specific Real Life Scenario of a German Railway Station</b> .....	639
M. Davidich and G. Köster	
<b>Cognition-oriented Simulation of Pedestrian Dynamics</b> .....	647
Wassim Abu Abed and Volker Berkhahn	
<b>Comparison of Different Calibration Techniques on Simulated Data</b> ...	657
Christian Rudloff, Thomas Matyus, and Stefan Seer	
<b>Evacuation Agent Simulation in an Underground Shopping Street Adding a Floor Field Approach and Its Three Dimensional Expression</b> .....	673
Yoshiyuki Kobayashi, Toshiyuki Kaneda, Masaki Tamada, Taichi Shimura, and Keisuke Hata	
<b>Frozen Shuffle Update in Simple Geometries: A First Step to Simulate Pedestrians</b> .....	683
J. Cividini, C. Appert-Rolland, and H.J. Hilhorst	
<b>Fundamental Diagram as a Model Input: Direct Movement Equation of Pedestrian Dynamics</b> .....	691
E. Kirik, A. Malyshev, and E. Popel	

<b>Improving Flexibility of Agent's Path Selection in Cellular Pedestrian Flow Model .....</b>	<b>703</b>
Juha-Matti Kuusinen and Sergey Kitov	
<b>Including Route Choice Models into Pedestrian Movement Simulation Models .....</b>	<b>713</b>
D. Bauer and J. Gantner	
<b>Integrating Lateral Swaying of Pedestrians into Simulations.....</b>	<b>729</b>
Barbara Krausz and Christian Bauckhage	
<b>Integration of a Multi-modal Simulation Module into a Framework for Large-Scale Transport Systems Simulation .....</b>	<b>739</b>
Christoph Dobler and Gregor Lämmel	
<b>Merging Processes of Pedestrian Queues .....</b>	<b>755</b>
Daniel Weber, Florian Knorr, and Michael Schreckenberg	
<b>Methodology for Pedestrian Analysis in Public Spaces Based on Probabilistic Approach .....</b>	<b>761</b>
Ignacio Martínez and Ana Olmeda	
<b>Methods for Modeling and Simulation of Multi-destination Pedestrian Crowds .....</b>	<b>775</b>
Günter Bärwolff, Minjie Chen, Frank Huth, Gregor Lämmel, Kai Nagel, Matthias Plaue, and Hartmut Schwandt	
<b>Modeling Pedestrian Route Choice During Large Public Gatherings ...</b>	<b>789</b>
Lei Feng and Elise Miller-Hooks	
<b>Pedestrian Group Behavior in a Cellular Automaton.....</b>	<b>807</b>
Michael Seitz, Gerta Köster, and Alexander Pfaffinger	
<b>Modeling Time Duration of Planned and Unplanned Store Visits in a Multi-Agent Simulation of Pedestrian Activity in City Centers.....</b>	<b>815</b>
Jan Dijkstra, Harry Timmermans, Joran Jessurun, and Bauke de Vries	
<b>Motions Effect for Crowd Modeling Aboard Ships .....</b>	<b>825</b>
K.V. Kostas, A.-A.I. Ginnis, C.G. Politis, and P.D. Kaklis	
<b>On Modeling Groups in Crowds: Empirical Evidence and Simulation Results Including Large Groups .....</b>	<b>835</b>
Verena Reuter, Benjamin S. Bergner, Gerta Köster, Michael Seitz, Franz Tremel, and Dirk Hartmann	
<b>Pedestrian Agent Based Model Suited to Heterogeneous Interactions Overseen by Perception .....</b>	<b>847</b>
L. Bourgois and J.-M. Auberlet	

<b>Pedestrian Gap Acceptance in Micro-Simulation Modelling.....</b>	<b>861</b>
Paul Simon Townsend	
<b>Pedestrian Simulation Using Geometric Reasoning in Velocity Space ...</b>	<b>875</b>
Sean Curtis and Dinesh Manocha	
<b>Quantitative and Qualitative Validation Procedure for General Use of Pedestrian Models.....</b>	<b>891</b>
Mario Campanella, Serge Hoogendoorn, and Winnie Daamen	
<b>Shared Space Modeling Based on Social Forces and Distance Potential Field .....</b>	<b>907</b>
Bani Anvari, Winnie Daamen, Victor L. Knoop, Serge P. Hoogendoorn, and Michael G.H. Bell	
<b>Simulation Model for Vehicle and Pedestrian Interaction Considering Road Crossing Activities .....</b>	<b>917</b>
Bruno R. Werberich, Carlos O. Pretto, and Helena B.B. Cybis	
<b>Simulation Models of Merging Priorities in Staircases .....</b>	<b>925</b>
Henri Hakonen and Marja-Liisa Siikonen	
<b>Simulation of Handicapped People Finding Their Way Through Transport Infrastructures.....</b>	<b>935</b>
Helmut Schrom-Feiertag, Thomas Matyus, and Martin Brunnhuber	
<b>Simulation of Pedestrian Dynamics with Density Control on a Regular Grid .....</b>	<b>949</b>
Minjie Chen, Günter Bärwolff, and Hartmut Schwandt	
<b>Evacuation of Day Care Centres for Children 0–6 Years: Simulations Using Simulex .....</b>	<b>959</b>
L. Ulriksen and A.S. Dederichs	
<b>Stochastic Transition Model for Pedestrian Dynamics.....</b>	<b>971</b>
Michael Schultz	
<b>Toward Simulation-Based Egress Optimization in Smart Buildings Using Symbiotic Simulation.....</b>	<b>987</b>
Heiko Aydt, Michael H. Lees, Stephen J. Turner, and Wentong Cai	
<b>The Development and Calibration of an Agent-Based Microsimulation Model for Vehicle-Pedestrian Interaction .....</b>	<b>1001</b>
Rahul Jobanputra and Marianne Vanderschuren	
<b>The Effect of Integrating Travel Time .....</b>	<b>1013</b>
Tobias Kretz	
<b>Using a Multi-Scale Model for Simulating Pedestrian Behavior.....</b>	<b>1029</b>
Angelika Kneidl, Dirk Hartmann, and André Borrmann	

<b>Using the Social Force Model to Represent the Behavior of Pedestrians at Chaotic Intersections of Developing Countries: The Case of Peru</b> .....	1039
Felix Cabrera Vega and Juan Carlos Dextre	
<b>Validation of Crowd Models Including Social Groups</b> .....	1051
Gerta Köster, Franz Tremml, Michael Seitz, and Wolfram Klein	
<b>Velocity-Based Models for Crowd Simulation</b> .....	1065
Julien Pettré, David Wolinski, and Anne-Hélène Olivier	
 <b>Part IV Psychology</b>	
<b>Fuzzy Prediction of Pedestrian Steering Behavior with Local Environmental Effects</b> .....	1081
Mojdeh Nasir, Matthew Glenn Watson, Vu Le, Saeid Nahavandi, and Douglas Creighton	
<b>Group Dynamic Behavior and Psychometric Profiles as Substantial Driver for Pedestrian Dynamics</b> .....	1097
Michael Schultz, Lars Rößger, Hartmut Fricke, and Bernhard Schlag	
<b>Investigating Human Factors in Fire Evacuation: A Serious-Gaming Approach</b> .....	1113
K. Schatz, J. Schlittenlacher, D. Ullrich, U. Rüppel, and W. Ellermeier	
<b>Occupants Emergency Behaviour in Turkey</b> .....	1123
Nese Çakici Alp and Gülen Çağdaş	
<b>Psychological Aspects of German Signal Words in Evacuation Warnings</b> .....	1135
Laura Künzer, Gesine Hofinger, and Tina Zink	
<b>Psychological Aspects of Human Dynamics in Underground Evacuation: Field Experiments</b> .....	1149
Robert Zinke, Gesine Hofinger, and Laura Künzer	
<b>The Effects of the Design Factors of the Train-Platform Interface on Pedestrian Flow Rates</b> .....	1163
Taku Fujiyama, Roselle Thoreau, and Nick Tyler	
<b>Understanding Crowd Panic at Turning and Intersection Through Model Organisms</b> .....	1175
Nirajan Shiwakoti, Majid Sarvi, Charitha Dias, and Martin Burd	



**Part V Miscellaneous**

<b>A Study for Estimation of Ventilation Capacity of Large Enclosure Considering Real Fire Load .....</b>	<b>1187</b>
Chan-sol Ahn and Jung-yup Kim	
<b>Multi-agent Transport Simulation for Regional Evacuation Processes .....</b>	<b>1197</b>
Mohamed Bakillah, Hubert Klüpfel, Gregor Lämmel, and Georg Walenciak	
<b>Agent-Based Simulations of Pedestrian Movement for Site Security: U. S. Secret Service's Current Capabilities and Next Steps....</b>	<b>1207</b>
Douglas A. Samuelson	
<b>Ant Colony Based Evacuation Route Optimization Model for Mixed Pedestrian-Vehicle Flows.....</b>	<b>1213</b>
Qiuping Li, Zhixiang Fang, and Qingquan Li	
<b>Collecte of Data Stemming from the Fine Trajectory of the Pedestrians .....</b>	<b>1225</b>
Adiaviakoye Ladji, Plainchault Patrick, Bourcerie Marc, and Auberlet Jean Michel	
<b>Dynamic Medium Scale Navigation Using Dynamic Floor Fields .....</b>	<b>1237</b>
Dirk Hartmann, Jana Mille, Alexander Pfaffinger, and Christian Royer	
<b>Effect of Social Groups on Crowd Dynamics: Empirical Findings and Numerical Simulations .....</b>	<b>1251</b>
Dirk Oberhagemann, Rainer Könnecke, and V. Schneider	
<b>Estimating PCE-Type Factors for Heterogeneous Pedestrian Traffic Using Simulation .....</b>	<b>1259</b>
Ronald John Galiza, Luis Ferreira, and Phil Charles	
<b>Getting Out of the Way: Collision-Avoiding Pedestrian Models Compared to the Real World .....</b>	<b>1275</b>
Gregor Lämmel and Matthias Plaue	
<b>Influence of Rhythm and Velocity Variance on Pedestrian Flow .....</b>	<b>1291</b>
Daichi Yanagisawa, Akiyasu Tomoeda, and Katsuhiro Nishinari	
<b>Interaction Behavior Between Individual Pedestrians .....</b>	<b>1305</b>
Winnie Daamen, Serge Hoogendoorn, Mario Campanella, and Dirk Versluis	
<b>New Wayfinding Techniques in Pathfinder and Supporting Research ...</b>	<b>1315</b>
Charles Thornton, Richard O'Konski, Bryan Klein, Brian Hardeman, and Daniel Swenson	

<b>OpenPedSim: A Framework for Pedestrian Flow Analysis</b> .....	1323
Armel Ulrich Kemloh Wagoum, Mohcine Chraïbi, Christian Eilhardt, Stefan Nowak, Igor Kulkov, Daniel Weber, Kathrin Sauer, Hubert Klüpfel, and Andreas Schadschneider	
<b>Optimizing Pedestrian Environments with Evolutionary Strategies</b> .....	1331
Marijn Swenne and Thomas Bäck	
<b>Estimating Pedestrian Destinations Using Traces from WiFi Infrastructures</b> .....	1341
Antonin Danalet, Michel Bierlaire, and Bilal Farooq	
<b>Pedestrian Conflicts, Pedestrian Comfort Levels, and Current Pedestrian Levels of Service</b> .....	1353
Jaisung Choi, Sangyoup Kim, Sunggyu Kim, Minsu Jin, Yongseok Kim, and Jinkug Kim	
<b>Scalable Evacuation Simulation and Visualization Using GPU Computing</b> .....	1365
Kensuke Yasufuku	
<b>Starting-wave and Optimal Density in a Queue</b> .....	1375
Akiyasu Tomoeda, Daichi Yanagisawa, Takashi Imamura, and Katsuhiro Nishinari	
<b>The Love Parade Disaster</b> .....	1385
Hubert Klüpfel	
<b>Utilizing Crowd Insights to Refine Disease-Spreading Models</b> .....	1395
Anders Johansson and Lara Goscè	
<b>Venue Suitability for Large-Scale Events from the Viewpoint of Safety Measures</b> .....	1405
Masatoshi Kaitsuji and Akihiko Hokugo	
<b>WALK: A Modular Testbed for Crowd Evacuation Simulation</b> .....	1417
Stefan Münchow, Ia Enukidze, Stefan Sarstedt, and Thomas Thiel-Clemen	

Pedestrian and Evacuation Dynamics 2012

Weidmann, U.; Kirsch, U.; Schreckenberg, M. (Eds.)

2014, XXIV, 1424 p. 716 illus., 536 illus. in color. In 2

volumes, not available separately., Hardcover

ISBN: 978-3-319-02446-2