Pedestrian dynamics – empirics and modelling

Overview	Pedestrian movements form the key of accessing the infrastructure for large pedestrian streams. Understanding the dynamics and transport characteristics of crowds is crucial to design emergency routes in buildings like schools, sport stadia or museums, to optimize public transport infrastructures like train or underground stations, airplanes or carriers and to organize religious festivals or other large public events. The course starts with a critical discussion of the concept of mass panic along with various case studies of crowd disasters. Alternative concepts, like herding, collective phenomenon or competitive and cooperative behavior are introduced in the context of pedestrian dynamics to describe the risks and problems of crowds. To describe their transport properties quantities like flow, density and speed are defined along with state of the art measurement methods and techniques of data gathering. The relation between flow, density and speed (fundamental diagram) allows studying influences like culture, motivation, age as well as structural factors of streams like the multi-directionality or heterogeneity. For designing and assessing pedestrian facilities macroscopic and microscopic approaches could be used. For a macroscopic model we introduce and exercise the procedure developed by Predtetschenskii and Milinskii. The overview of microscopic models includes Cellular Automata and models continuous in space like force models from physics or obstacle velocity models from robotics. Additionally models to incorporate higher level of behavior like navigation or group behavior are discussed. The definition of all starting and boundary conditions for a simulation with microscopic models is complex and introduced in combination of emergency scenario. At the end of the course different research projects on crowds like the development of an evacuation assistant or on guidelines for the safety of large public events is presented. Given the fact in India, pedestrians form the most vulnerable road users, where majority of them are killed annually in road related crashes. It is thus important to understand as to how to make their movements safer while interacting with road environment. This course intends to equip the participants with the fundamentals of pedestrian dynamics. At the end of the course, the learners would be able to qualitatively and quantitatively assess the pedestrian facilities and ways to make them safer and efficient. Course participants will learn these topics through lectures, small scale experiments and exercises. Also case studies and actual research projects will be shared to stimulate research motivation of participants.
Modules	**Wednesday, November 8 – Tuesday, November 14, 2017** **A. Introduction to human crowd behaviour** **B. Quantitative description of pedestrian streams and Empirics** **C. Microscopic and macroscopic modelling of pedestrian behaviour** **D. Simulations and research outlook** *** Number of participants for the course will be limited to thirty.**
You Should Attend If…	▪ you are an civil engineer interested in designing pedestrian facilities for large pedestrians streams and movement dynamics of crowds. ▪ you are a physicist, mathematician or computer scientist interested in modeling and simulation of crowd movement. ▪ you are a student or faculty from academic institution interested in learning how to do research on pedestrian and evacuation dynamics by empirical methods and modeling.
Fees	The participation fees for taking the one-week course is as follows: **I. Students: Rs. 5,000** **II. Academic Institutions (Faculty Members): Rs. 10,000** **III. Working Professionals (Research/Industry): Rs. 15,000** **IV. Participants from Overseas: USD 300** ***Research Scholars / Students from IIT Delhi need not pay any fee***

	The above fee includes all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges, 24 hour free internet facility, and one site visit expenses. The participants will be provided with accommodation on payment and first-come-first-serve basis. The Participation fees for the CEP programmes under GIAN will be accepted only through Demand Drafts drawn in favour of "IITD CEP Account" or e-transfer/RTGS/NEFT. Bank detail are given below: Under:

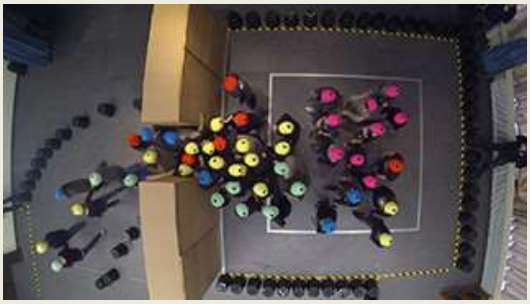
Bank Account No.	36819334799
Bank Address	State Bank of India, IIT Delhi, Hauz Khas New Delhi-16
MICR Code	110002156
Beneficiary	IITD CEP ACCOUNT
IFSC Code	SBIN0001077
Account Type	Savings

Faculty

Armin Seyfried, Ph.D. (Bergische Universität Wuppertal) is a Professor in the Faculty of Architecture and Civil Engineering of the University of Wuppertal, Germany. At the Jülich Supercomputing Centre of the Research Center Jülich he established a new research group for pedestrian dynamics and fire simulation, which evolved 2012 into the division Civil Security and Traffic. His interest lies mainly in pedestrian dynamics with the focus on validation experiments, model development as well as engineering application. Prof. Seyfried has authored or co-authored more than 200 papers in peer reviewed journals, books and conference proceedings. He is member of the German standardization committee "DIN NABau: Fire safety engineering" and member of the steering committees of the conference series "Pedestrian and Evacuation Dynamics" and "Traffic and Granular Flow". In 2016 he founded the public access journal "Collective Dynamics".

K. Ramachandra Rao, Ph.D. (IIT Kharagpur) is currently a Professor in Department of Civil Engineering at the Indian Institute of Technology Delhi. His research interests are Traffic modelling, pedestrian dynamics and public transit planning. He is also an Associate Faculty at Transportation Research and Injury Prevention Programme (TRIPP). Prof. Rao has published more than 70 papers in peer reviewed journals and conference proceedings.

Geetam Tiwari, Ph.D. (University of Illinois Chicago) is currently a MoUD Chair Professor in Civil engineering and Associate Faculty in Transportation Research and Injury Prevention Programme (TRIPP). Her research interests include Sustainable urban transportation modelling, Low carbon mobility and Safe and sustainable urban infrastructure. She is widely published with over 200 papers in peer reviewed journals, books and conference proceedings. Currently she is the Editor-in-Chief of 'International Journal of Injury Control and Safety Promotion' (Taylor and Francis)



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