Computer rule-based model for housing and urban design
Sustainable, affordable, and participatory mass customized housing and urban planning

José P. Duarte | Associate Professor, TU Lisbon, jduarte@fa.utl.pt | Visiting Scientist, MIT, jduarte@mit.edu

The traditional approach to the design of a large housing estate is to design a limited number of types and then to repeat these based on market analysis. This approach led to uniform housing and rigid urban plans. Contemporary rule-based computer-aided design and manufacturing processes can overcome such flaws and produce, following a participatory process, customized houses and diverse urban environments that are sustainable and affordable. The goal is to give mass-produced houses some of the qualities associated with individually designed ones and to endow planned environments with the qualities associated with traditional settlements. These tools are particularly appropriate for contexts experiencing fast urbanization and help to mediate the dialogue among the different stakeholder of urban development processes: users, designers, town halls, developers, builders, and funding agencies.

Informal settlement: fast growth, participatory, customized, chaotic, with social problems

Planned settlement following a traditional approach: fast growth, non-participatory, non-customized, monotonous, with social problems

Traditional settlement: slow growth, participatory, customized, diverse

Planned settlement following a computer rule-based approach: fast growth, participatory, customized, diverse
José P. Duarte holds a professional degree in architecture from TU Lisbon (1987) and an S.M.Arch.S. (1993) and a Ph.D. (2001) in Design and Computation from MIT. Currently a Visiting Scientist at MIT, he is Associate Professor at TU Lisbon Faculty of Architecture and researcher at Instituto Superior Técnico, where he founded the ISTAR Labs - IST Architecture Research Laboratories. His main research interests are sustainable mass customization, with a special focus on housing and urban design, and the application of shape grammars and new technologies to architecture and urban design in general. He has authored numerous articles and regularly lectures on these topics at an international level. He is the author of “Collaborative Design and Learning” (with J. Bento, M. Heitor e W. J. Mitchell, Praeger 2004), and “Personalizar a Habitação em Série” (Calouste Gulbenkian Foundation, 2007). Articles on his work appeared on large circulation magazines such as A+U, Popular Science, and New Scientist.

Email: jduarte@fa.utl.pt