

# Some Challenges for System Development: Layout, Olfaction and Reactive Animation

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This series of lectures will revolve around three topics that are seemingly peripheral to the "classical" notion of system development. Here are brief summaries of these, followed by some pointers to published papers.

**Layout:** Motivated by the fast proliferation of graphical languages for system development, we will survey 13 years of our group's work on graph layout. It will start with a simulated annealing algorithm that works well for graphs with 20-40 nodes, and will culminate in extremely powerful multi-scale approaches that produce beautiful renditions of million-node graphs in very reasonable time. Time permitting, we shall discuss the special issues around higraphs (e.g., statecharts) too.

**Olfaction:** We propose a setup for an odor communication and synthesis system. Its different parts will be described, and ways to realize them will be outlined. Our approach enables an output device — the whiffer — to release an imitation of an odor read in by an input device — the sniffer — upon command. The heart of the system is the novel mathematical/algorithmic scheme that makes the scheme feasible. The talk will discuss in some detail our work in researching and developing some of the components that constitute the scheme, many of which have to do with the analysis of eNose space.

**Reactive Animation:** We shall present a method to enrich models of reactive systems with an animated, interactive and intuitive front-end. The method harnesses the available strength of state-of-the-art tools and languages for reactive system design and tools for animation. The idea originated in needs arising during our efforts to simulate biology. While the method appears to be very broadly applicable, we shall demonstrate it in the realm of biological systems.

## Bibliography

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