Abstract:
The embedding of layered graphs is a key component in software for drawing directed graphs such as GraphViz. The primary objective and the focus of intensive research over the last 35 years has been to minimize the total number of edge crossings. Other objectives have received attention more recently. Two of these are bottleneck crossing minimization (minimize the maximum number of crossings for any edge), which has application to minimizing crosstalk in integrated circuits, and verticality, where the goal is to make edges/paths in the drawing as vertical as possible. The first part of the talk will discuss (i) experimental results for heuristics aimed at these objectives; and (ii) tradeoffs between the objectives. Special focus is on measurable graph characteristics that impact the performance of heuristics or how well the objectives correlate. The latter part of the talk will present Galant, a tool that facilitates the process of creating animations of graph algorithms. Galant has been used extensively for research, including the layered graph research described above, as well as for its original purpose: to provide students a platform for creating their own compelling animations of algorithms learned in class.

Bio:
Matthias (Matt) Stallmann is Professor of Computer Science and Assistant Director of Graduate Programs at North Carolina State University. Before joining NCSU in 1984, he taught courses at the University of Denver. Dr. Stallmann received a PhD in Computer Science from the University of Colorado, Boulder. Both his BA and MS degrees are from Yale University. Dr. Stallmann has been actively involved in a wide variety of research areas including graph algorithms, combinatorial optimization, experimental algorithms, VLSI design, operations research, graph drawing, accessibility of graphs for blind users, and databases. He is an Associate Editor of the ACM Journal of Experimental Algorithmics and has served on program committees, panels, and working groups related to experimental algorithms and graph drawing. In addition to research, Dr. Stallmann has been a leader in curriculum and program development, including the development of five courses in the core undergrad and grad curricula. He has served as chair of both the undergraduate and the graduate program committees, and is currently chair of the department's strategic planning committee.