Title: Hypohamiltonian and Almost Hypohamiltonian Graphs

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A graph is *hypohamiltonian* if it is not hamiltonian but, when omitting an arbitrary vertex, it becomes hamiltonian. A problem of Sousselier from 1963 initiated the study of these graphs. The smallest hypohamiltonian graph is the famous Petersen graph on 10 vertices. Among the work concerning hypohamiltonian graphs, Chvátal asked in 1973 whether there exist planar hypohamiltonian graphs, while Grünbaum conjectured that these graphs do not exist. An infinite family of such graphs was subsequently found by Thomassen, the smallest among them having order 105. In the past four decades smaller and smaller planar hypohamiltonian graphs have been found. These record-holders will be the main focus of the first part of the talk. In the second part, we present Grinberg's Criterion in the context of planar hypohamiltonian graphs and give two strengthenings of a theorem of Araya and Wiener. (One of these strengthenings is joint work with Jooyandeh, McKay, Östergård, and Pettersson.) For the final part of the presentation, we call a graph G *almost hypohamiltonian* if G is non-hamiltonian, there exists a vertex w such that $G - w$ is non-hamiltonian, and for any vertex $v \neq w$ the graph $G - v$ is hamiltonian. We discuss connections between hypohamiltonian and almost hypohamiltonian graphs and present—motivated by an old question of Thomassen—a 4-connected almost hypohamiltonian graph.