Artificial Intelligence has the potential to transform every field of engineering, by fusing machine learning, control, and optimization. This talk explores a number of research avenues in this direction, focusing on potential breakthroughs that the two technologies cannot achieve independently. It covers the concepts of optimization proxies, end-to-end learning, self-supervised learning, and compact learning. It illustrates these concepts on large-scale economic dispatch, optimal power flows, unit commitment, and real-time risk assessment.

Dr. Pascal Van Hentenryck is the director of the NSF AI Institute for Advances in Optimization, A. Russell Chandler III Chair and Professor of the School of Industrial and Systems Engineering, Georgia Institute of Technology, Atlanta, Georgia.