Heart and kidneys are the two major organ systems that maintain and regulate the circulation. This session will address pertinent relevant clinical questions that cardiovascular MR-exams have to answer. This will be done by

a) Briefly outlining relevant technical prerequisites for successful imaging
b) Demonstrating aunt-Minnie-like specific disease patterns and its major differentials
c) Presenting diseases that mutually affect the renal and cardiac system

The vascular system of the kidney can be affected by various diseases among the most common are atherosclerotic vascular disease affecting the large vessels and diabetic microangiopathy affecting the small vessels of the kidney. Both diseases can also affect the heart and lead to coronary artery disease, hypertensive cardiac hypertrophy and (silent) myocardial infarcts. A differential diagnosis of cardiac hypertrophy is hypertrophic cardiomyopathy which will be discussed in this course. Cardiovascular evaluation of patients with atherosclerosis and diabetes should hence always include both organ systems. On the other hand primary diseases of the kidney such as nephrotic syndrome and longstanding glomerulonephritis can trigger pathophysiologic cascades which eventually also affect the heart: volume overload might e.g. foster the emergence of a dilated cardiomyopathy, longstanding glomerulonephritis to cardiac amyloidosis. The cardio-renal feedback loop that also includes the release of Atrial natriuretic peptide (ANP) which changes Sodium excretion at the level of the renal tubuli. In the future this feedback loop might be subject to clinical functional imaging with BOLD and 23Na-MRI. Initial studies that proof the feasibility of such imaging concepts will also be presented. Rarer diseases
such as vasculitis and infectious diseases which could also affect the heart and the kidneys will not be discussed.