Abstract: Many of our everyday activities are now performed online - whether it is banking, shopping, or chatting with friends. Behind the scenes, these activities are implemented by large distributed systems that often contain machines from several different organizations. Usually, these machines do what we expect them to, but occasionally they 'misbehave' - sometimes by mistake, sometimes to gain an advantage, and sometimes because of a deliberate attack. In society, accountability is widely used to counter such threats. Accountability incentivizes good performance, exposes problems, and builds trust between competing individuals and organizations. In this talk, I will argue that accountability is also a powerful tool for designing secure distributed systems. An accountable distributed system ensures that 'misbehavior' can be detected, and that it can be linked to a specific machine via some form of digital evidence. The evidence can then be used just like in the 'offline' world, e.g., to correct the problem and/or to take action against the responsible organizations. I will give an overview of our progress towards accountable distributed systems, ranging from theoretical foundations and efficient algorithms to practical applications. I will also present one result in detail: a technique that can detect information leaks through covert timing channels.

Bio: Andreas Haeberlen is an Associate Professor at the University of Pennsylvania. His research interests are in security, distributed systems, and networking. Andreas received his PhD degree in Computer Science from Rice University in 2009; he is the recipient of a NSF CAREER award, and he was awarded the Otto Hahn Medal by the Max Planck Society.