This presentation overviews the theory and practice of fountain codes. Fountain codes are a new class of FEC codes that allow the efficient generation of as many encoding symbols as desired on the fly, i.e., these codes have no predetermined rate. Fountain codes are proving to have a wide variety of applications, including providing high quality and efficient streaming and file broadcast delivery over commercial cellular networks, enabling delivery of low latency high quality HDTV streaming over IP networks, and a variety of military applications. The most advanced class of fountain codes available today are called Raptor codes.

Broadcast streaming and file delivery over commercial cellular networks to mobile devices is an example of a compelling Raptor codes application. Unicast streaming and file delivery to mobile devices relies heavily on a number of lower layer mechanisms to provide efficiency, quality and reliability, e.g., individual retransmission of lost radio packets, but these mechanisms are not applicable to a broadcast network. On the other hand, there is increasing operator interest in streaming and file delivery over broadcast channels, for the obvious reasons of bandwidth savings and scalability. It has become evident that Raptor codes provide efficiency, quality and reliability for broadcast streaming and file delivery to mobile devices, as evidenced by the adoption of Raptor codes into the 3GPP MBMS and DVB-H IPDC standards.