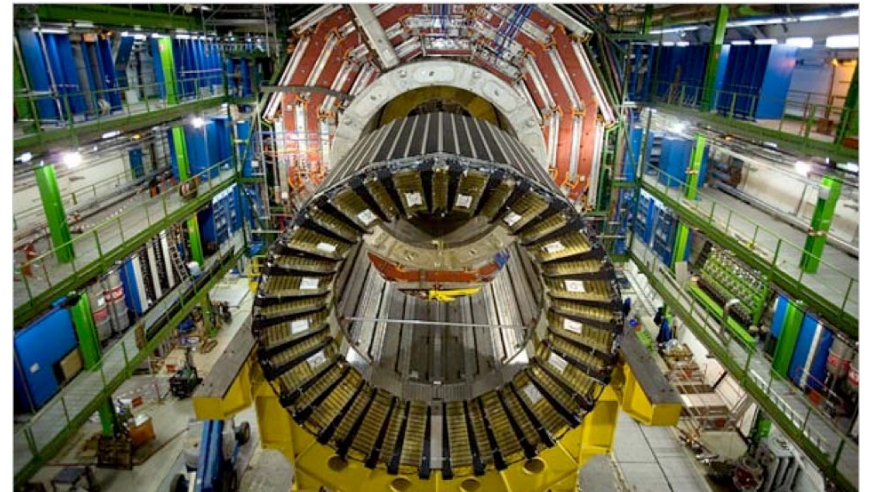


Signal Processing

Mislav Grgic
Richard Baraniuk

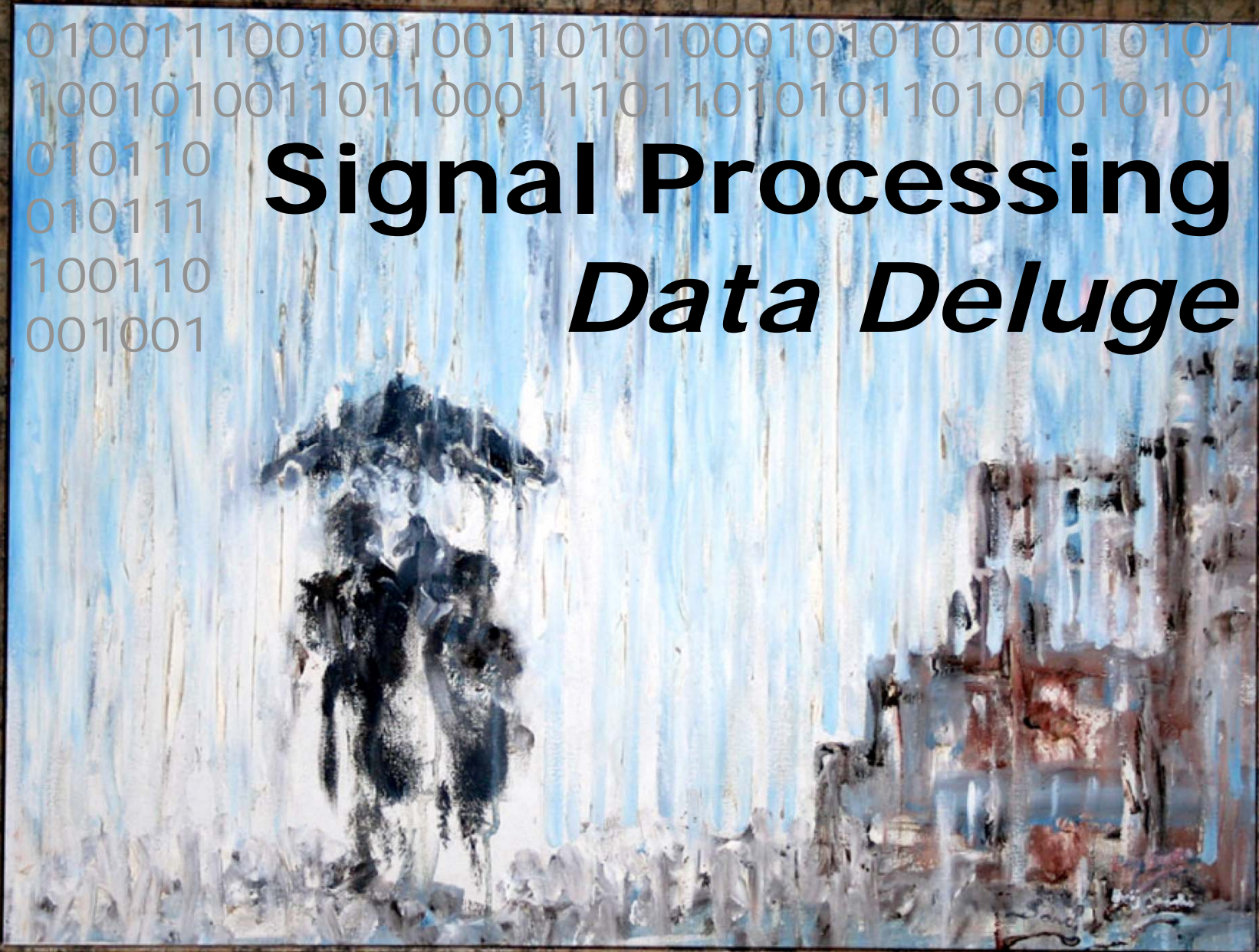
*advancing our capabilities
to acquire, extract, and
enhance information
from sensors and other
transducers*



010011100100100110101000101010100010101
100101001101100011101101010110101010101
010110
010111
100110
001001

Signal Processing

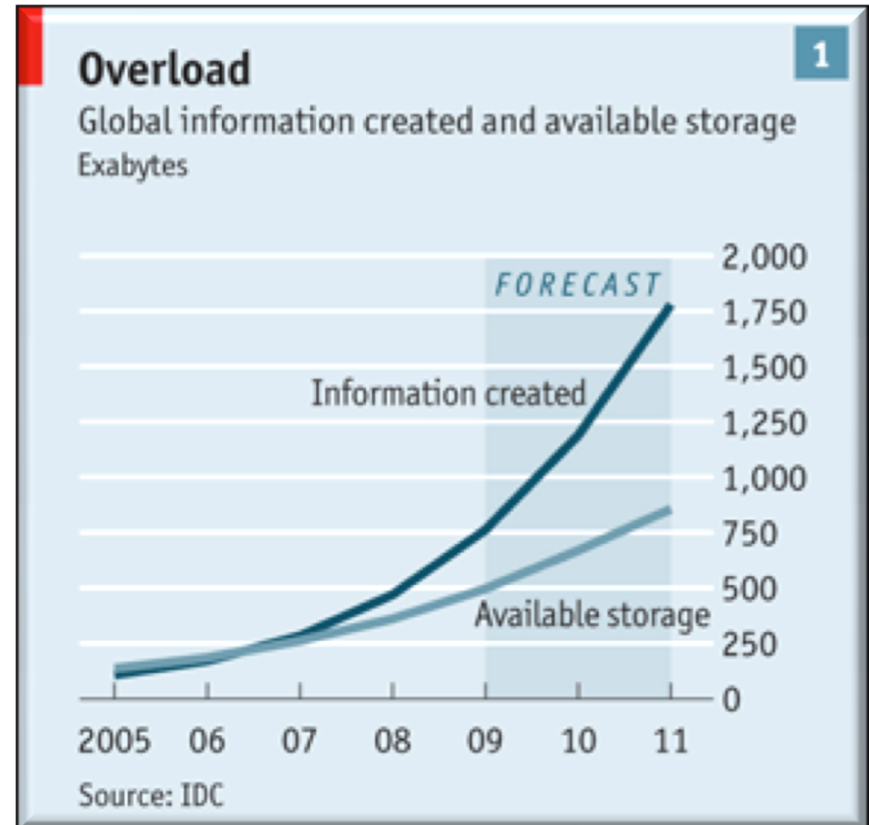
Data Deluge



Accelerating Data Deluge

- **1.25 trillion gigabytes** generated in 2010
 - # digital bits > # stars in the universe
 - growing by a factor of 10 every 5 years
 - **fueled** by rapid growth of digital sensing/multimedia

- **Total data generated > total storage**



- Increase in **generation rate** > increase in **communication rate**



Jerónimo Arenas-García

*Exploiting Diversity and
Specialization in Intelligent
Systems via Adaptive
Combination*

using machine learning to boost the
performance of signal processing
algorithms



Helmut Bolcskei

Managing Massive Interference

towards new communications technologies capable of carrying the data deluge



Martin Wainwright

*Discovering and Exploiting
Structure in High-
Dimensional Data Sets*

exploiting the wealth of available data
to discover heretofore unknown
structures



Emmanuel Candes

Compressive Sensing

radically new sensors enabled by
randomization + optimization that
compress as they sense