QUO VADIMUS
Applied Fractional Calculus

YangQuan Chen
University of California, Merced
yangquan.chen@ucmerced.edu
July 24, 2014
Key issues facing the AFC community

• Need to show that “fractional calculus” enables better performance (result) than the best achievable ones previously using “integer-order calculus”

• Need to show that “fractional calculus” enables new science discovery.

• Root causes of “fractional dynamics” and characterization
  – dynamic long memory effect,
  – randomness/stochasticity with changing distributions,
  – multi-scale, cross-scale, scale-richness, scale-dynamic

• Complexity changeability (e.g. climate change, human well-being)
  – quantify the complexity and then tune the quantity?
  – by the right fractional calculus math framework?