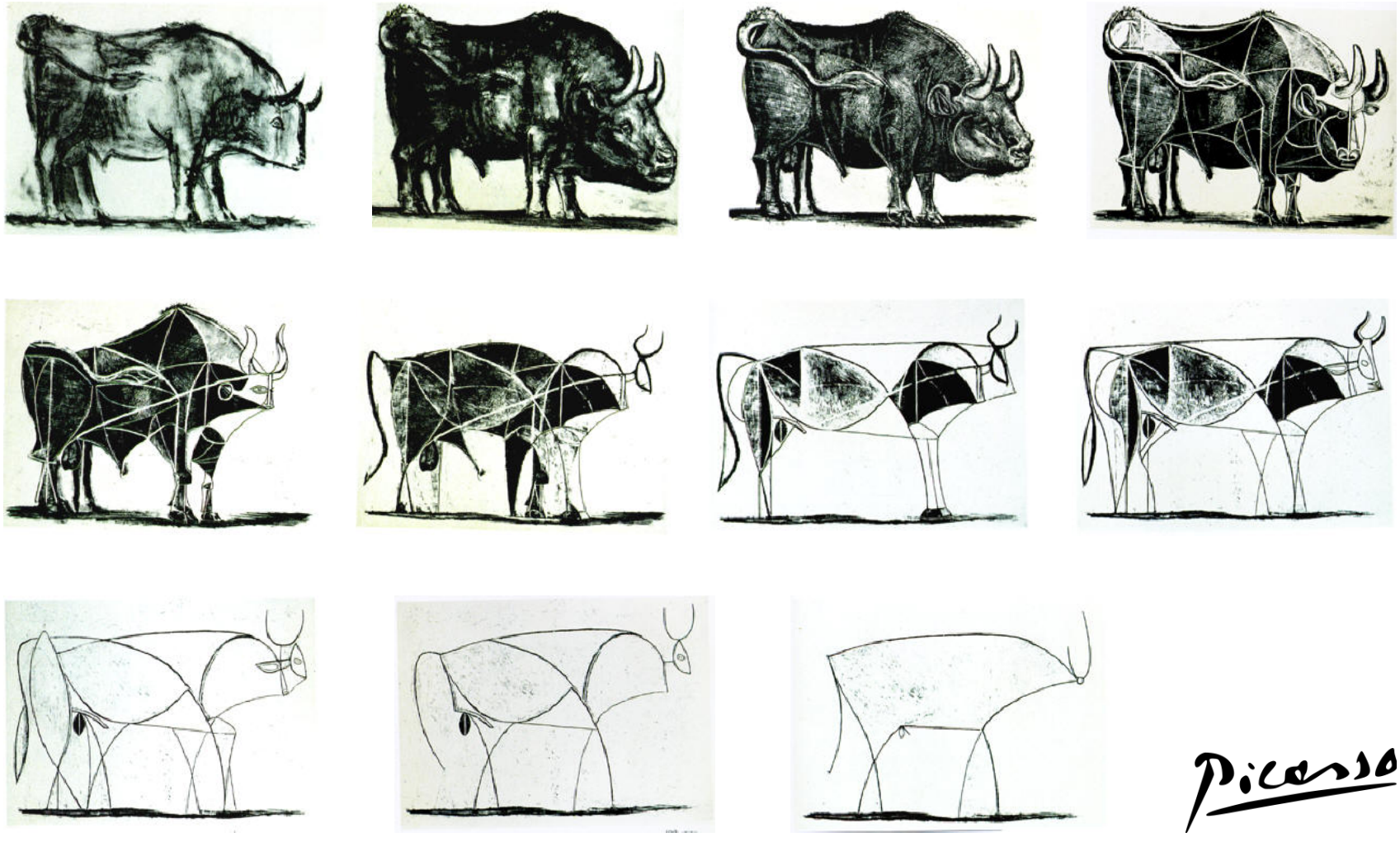
A Cartoon Guide to

cms.unipune.ac.in

The Spirit of (Mathematical) Modeling



The Spirit of Mathematical Modeling

- Abstraction: Keep only the essential
- Express model in the language of mathematics
- Explore model through simulation/computation
- Validate model against reality

The Spirit of Mathematical Modeling

Principle of Parsimony

aka

Occam's Razor

The Spirit of Mathematical Modeling

...
The fact that the polynomial is an approximation does not necessarily detract from its usefulness because all models are approximations. Essentially, all models are wrong, but some are useful. However, the approximate nature of the model must always be borne in mind.
...

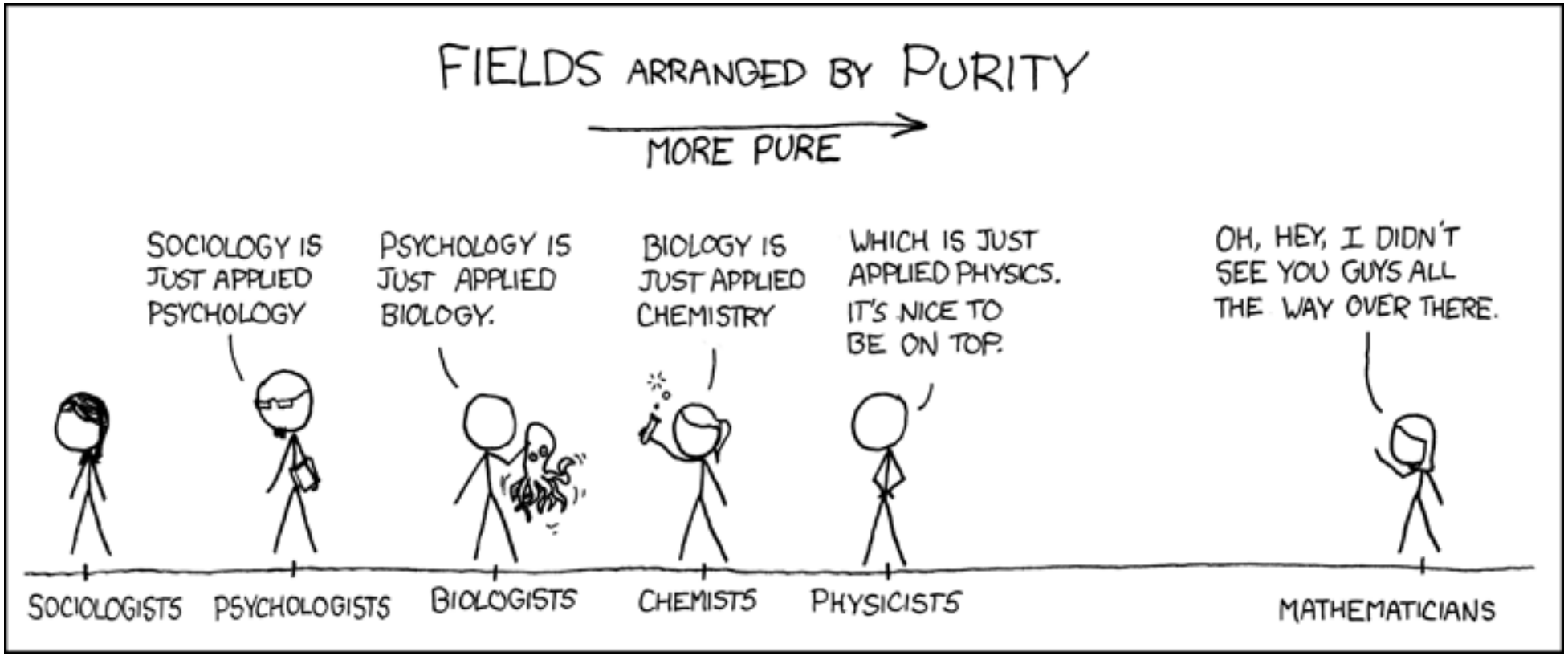
George E. P. Box
Empirical Model-Building and Response Surfaces (1987, p 424)

The Spirit of Mathematical Modeling

All models are right, most are useless.

Thaddeus Tarpey
http://works.bepress.com/thaddeus_tarpey/44/

Over-compartmentalization of knowledge?



mathematical models + computation/simulation
cut across traditional knowledge domains and disciplines

Centre for Modeling and Simulation
Savitribai Phule Pune University

cms.unipune.ac.in

Established in 2003 through funding from UGC, to

promote awareness about M&S methodologies

encourage, practice, and support multi-disciplinary problem-centric approaches to basic and applied research, transcending traditional boundaries separating knowledge disciplines

nurture expertise in fundamental methodological and technological areas, such as applied mathematics, applied statistics, computing, computing technologies, mathematical modeling, etc.

M.Tech. Programme in M&S (2008–)
M.Tech. Programme (Part Paper, Part Research) in M&S (2016–)

Broad-based, multi-disciplinary, intensive

Applied Mathematics
Applied Statistics
Computing
M&S Philosophy + Practice

Student Intake

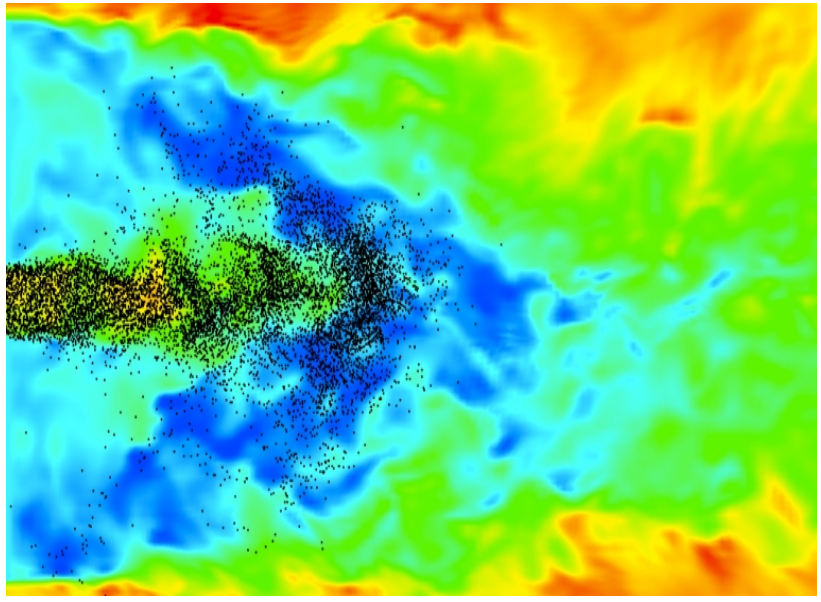
- Ideally (and in the past): Both science and engineering students with adequate mathematics background
- 2016-17 onwards, thanks to UGC, etc.: BE/BTech only
- 2017-18 onwards: BE/BTech OR MSc with valid GATE score

Prelude to the M.Tech. Programme:
Advanced Diploma Programme in M&S (2005–08)

Research @ CMS

Computational Materials
Atomistic/Molecular Modeling

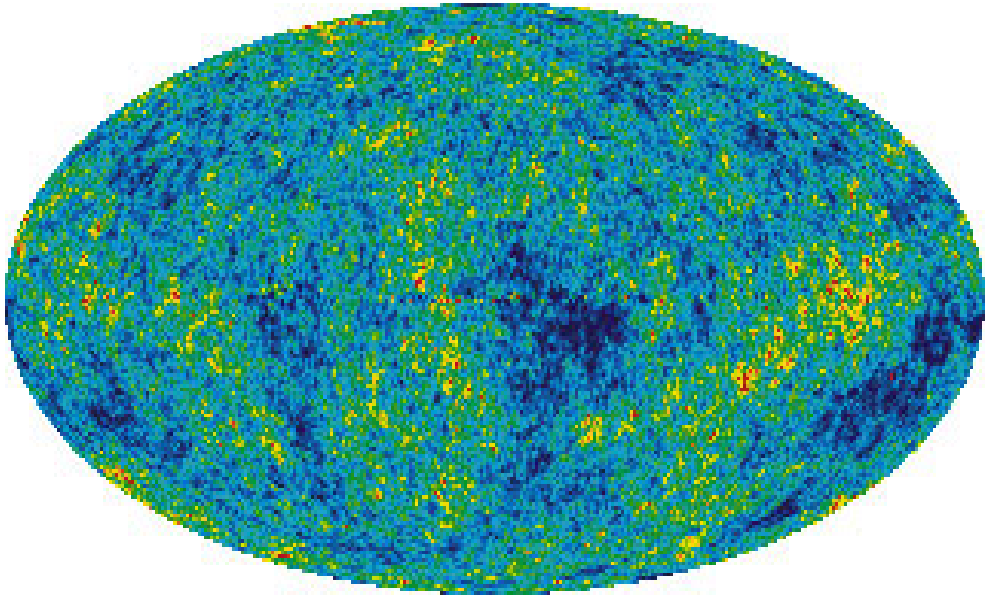
Computational Fluid Dynamics
Industrial Mathematics



Research @ CMS

Digital Signal & Image Processing

Statistical Science
Astrostatistics



CMS currently hosts the
University's Science Park initiative