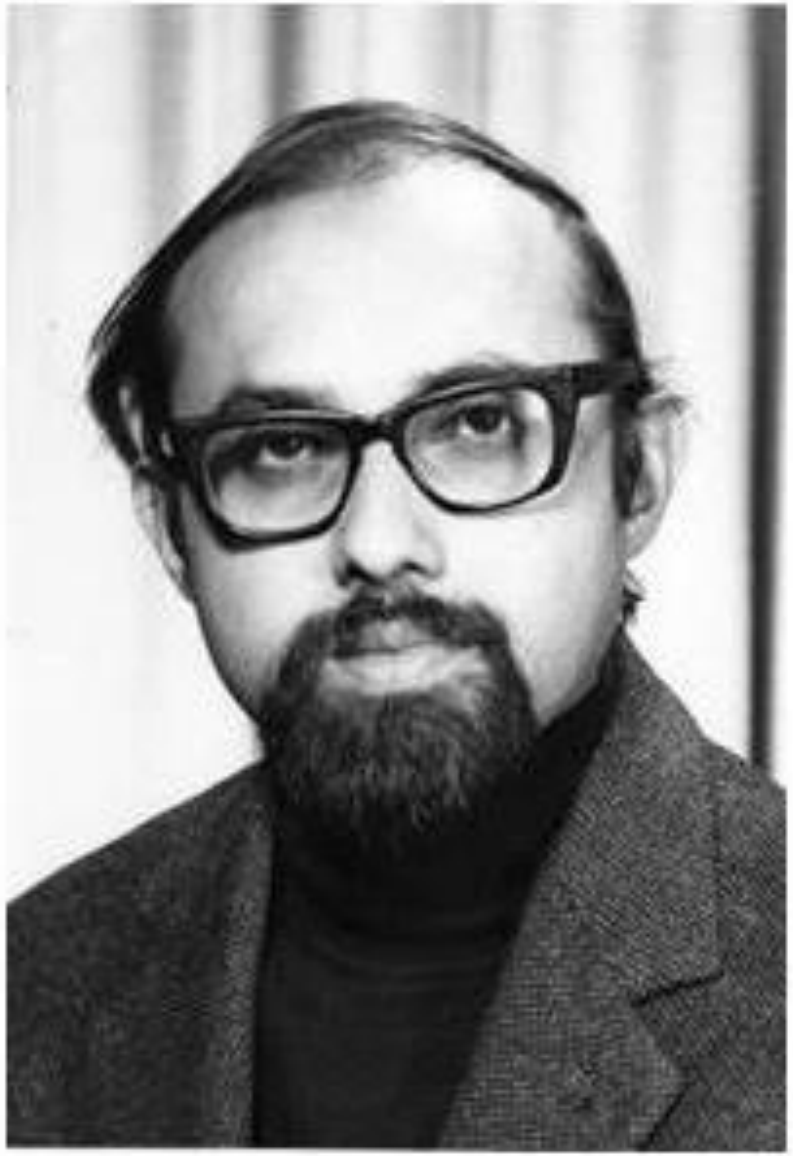
Sanjoy Kumar Mitter

… on the occasion of LIDS 80th anniversary celebration

Sanjoy …

- Arrived at MIT in 1969
  - From Case Institute/Case Western
  - Drove a Mustang!
- Was Director of LIDS 1981-86

  (Co-Director 86-99)
- Was Director, Center for Intelligent Control Systems 1986-2000
  - MIT-Harvard-Brown



Looking Back at Paths Ahead (2009)

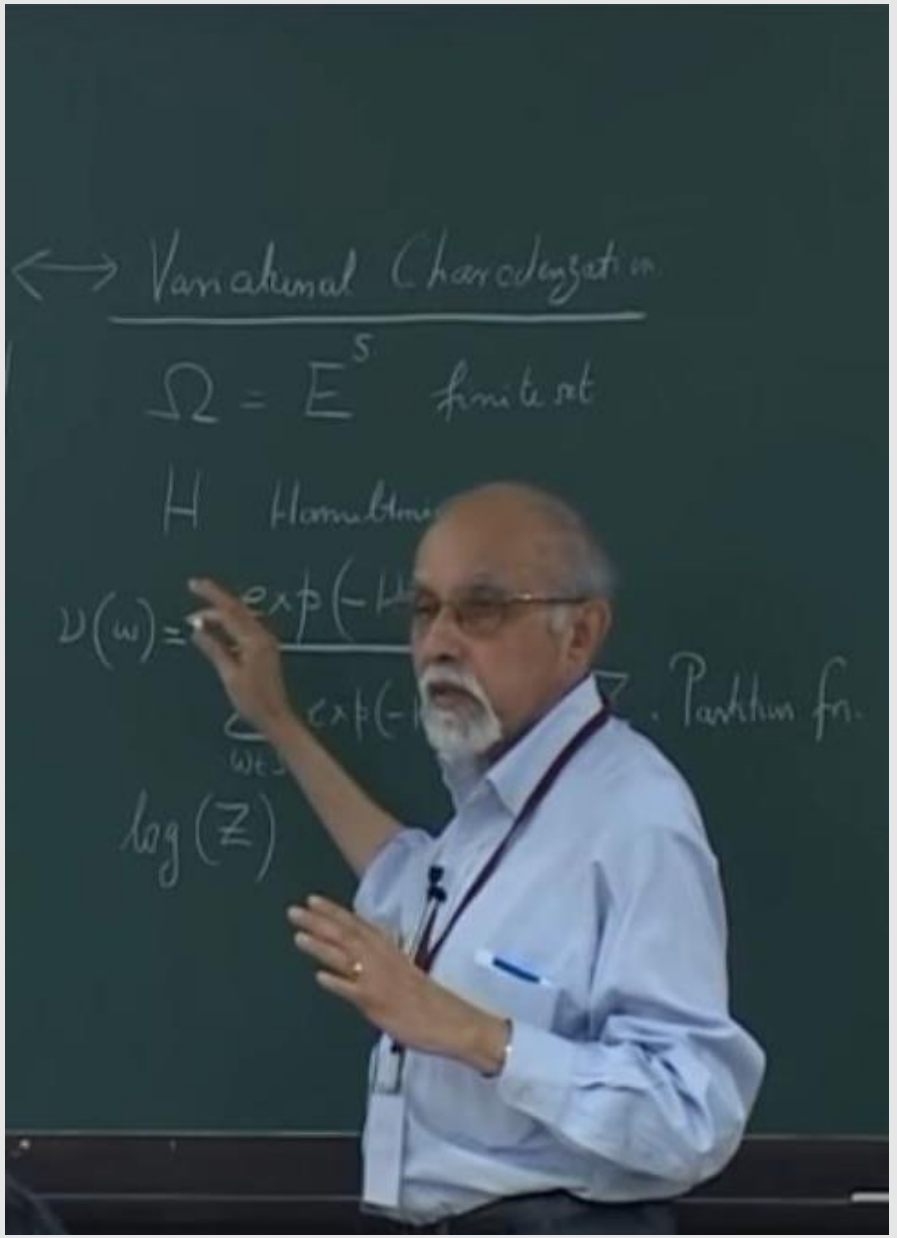
Looking Back at Paths Ahead (2009)

- New ideas from math and physics: J.L.Lions, mathematical programming, stochastic calculus, statistical mechanics, convex optimization,…
- Sanjoy's great support of his students
- The energy and excitement of LIDS, the many great visitors.
- Sanjoy's wisdom, character, and 'presence'

and “Retirement”

> 40 invited talks

- Variational Bayes - Formulation of Non-Linear Filtering
  - Information and entropy flow (e.g. in K-B filter)
  - Reliable communication
  - Non-equilibrium statistical mechanics
- “Inference, Learning and Approximation”
- “Information, Control, and Learning: The Ingredients of Intelligent Behavior”
- “Testing the Manifold Hypothesis”



"*Toward the Definition of a New Engineering Education*"
Sanjoy Mitter, 1985

"A signal needs to come from all levels of the administration that scholarship, intellectual depth, originality and creativity are the elements which make an institution great"

"Global Viewpoints"

- ***Filtering Theory and Quantum Fields, 1980***
- ***Nonlinear Filtering and Stochastic Mechanics, 1981***
- ***Estimation Theory and Statistical Physics, 1986***
- ***Nonlinear Filtering and Quantum Physics, 1987***
- ***Modelling and Estimation for Random Fields, 1993***
- ***Duality of Linear Input-Output Maps, 1994***
- ***Control with Limited Information, 2001***
- **…..**

"Science is the art of the solvable"

(Peter Medawar)

"What distinguishes engineering from the pure sciences (read physics) is that engineering is concerned with synthesis of new systems…"

"Perhaps these synthesis problems have something in common with global viewpoints present in great art and great literature."

"*Toward the Definition of a New Engineering Education*" - Sanjoy Mitter, 1985

"If you want to be a super-virtuoso, first you have to be a virtuoso." Vladimir Horowitz

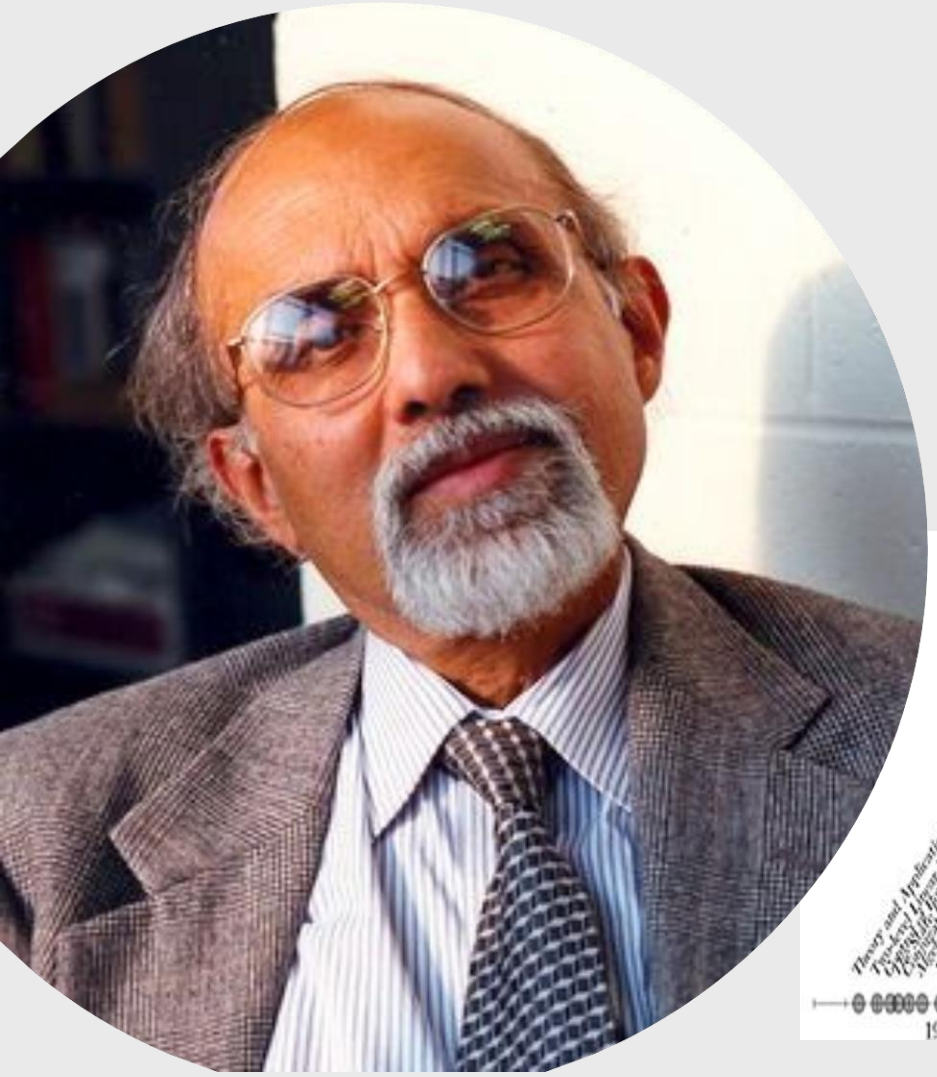
"He has furnished proofs in nonlinear filtering and optimal control theory" Wikipedia

- Newton's method in function spaces
  - *"Successive Approximation Methods for the Solution of Optimal Control Problems"*, 1966
- Pole placement theorem/method,
  - *"A Theory of Modal Control"*, (with J.D.Simon) 1968
- Innovations causal equivalence,
  - *"New Results on the Innovation Problem for Non-Linear Filtering"* (with D.F. Allinger) 1981
- Duality between filtering and stochastic control for the general non-linear case
  - *"Optimal Control and Pathwise Nonlinear Filtering for Nondegenerate Diffusions"* (with W. Fleming) 1982
- ….

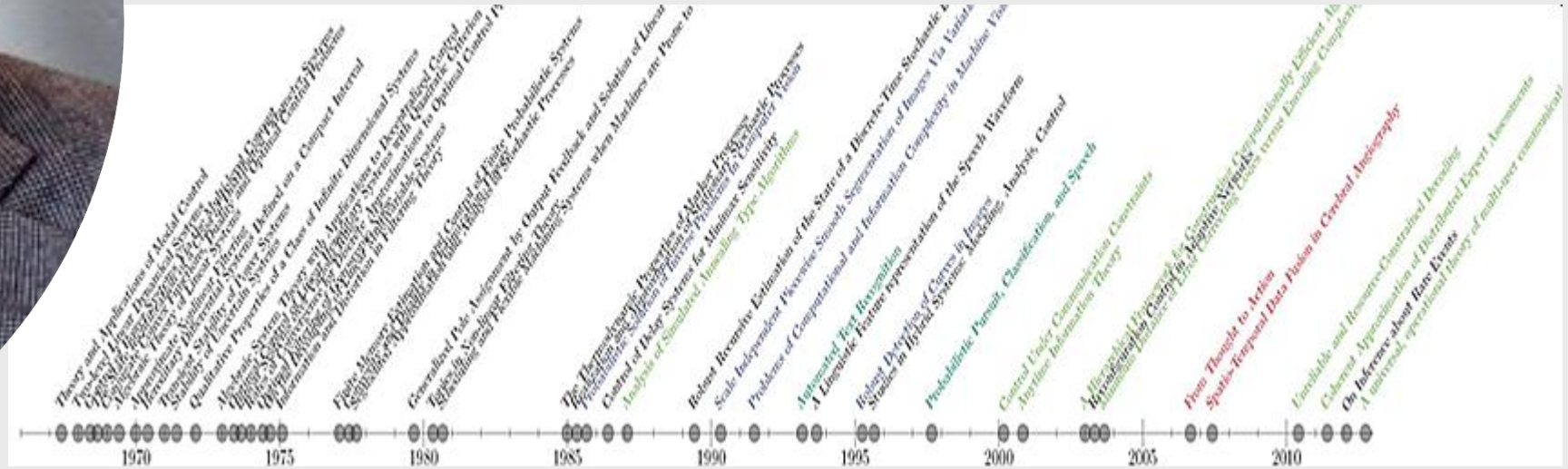
“Presence”

Leonard Gould, Sanjoy, Mike Athans, Fred Schweppe, Jan Willems

Sanjoy as an advisor- "you've been doctored"



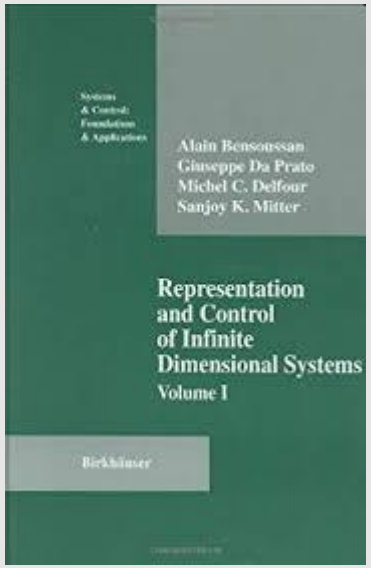
- Random fields, statistical mechanics, renormalization group, functional analysis, …
- Mumford-Shah

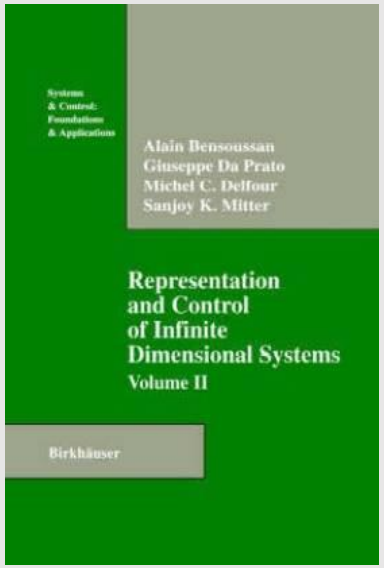


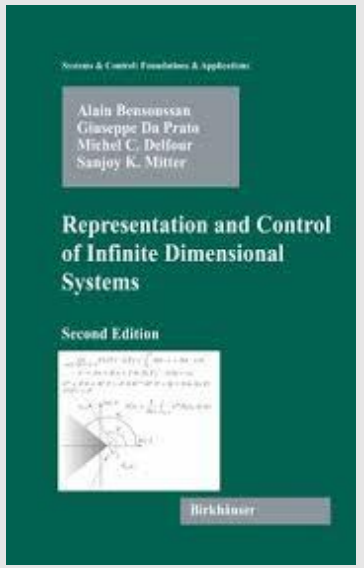
Ph.D's supervised, color indicates 'area'

Stories, pictures, quotes, …
It is not obvious. So many nice things have been said when he retired.
He has been a father for his students,

Michel Delfour







#8. Delfour, M.C., "Hereditary Differential Systems Defined on a Compact Interval," Case Western Reserve University, June 1970.

Thank you Sanjoy!