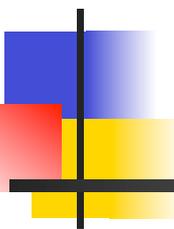


Building a Career on the Kindness of Others¹
or
Being in the Right Place at the Right Time²
or
When You Come to a Fork in the Road...³



Alan S. Willsky

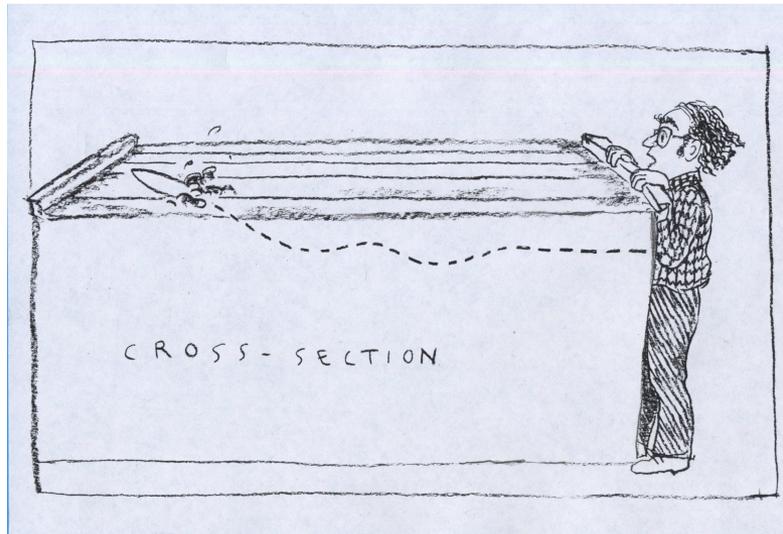
May 2013

1. With apologies to Tennessee Williams and Blanche Dubois
2. E.g., see *Forrest Gump*
3. With thanks to Yogi Berra

BITRP#1 & KOO#1

- New Jersey (1968)

- With thanks to Ma Bell, Lady Bird Johnson, and Mike Rabins



Lesson#1: Internships can and should be much more than summer jobs

Lesson#2: The "dual" of a well-known phrase about the relationship of theory and practice (more later)

BITRP#1-A & KOO#1-A

- New Jersey (1969): Bell Labs #2
 - Lament from my mentors about MIT's loss and strong recommendations for my graduate pursuits
 - Heartfelt thanks to Shelly Horing, Harry Heffes, Len Forys, Jack Holtzman
 - Rejoicing in my Hertz-based good fortune that allowed me to consort with our "friendly rival" and meet Roger Brockett



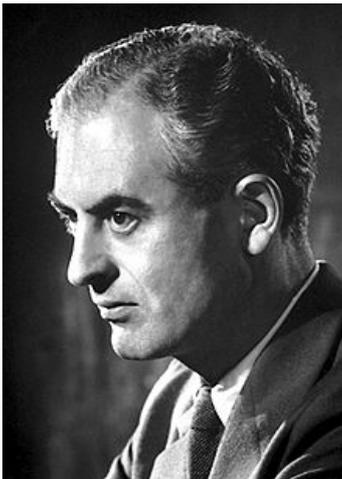
BITRP#2, WYCTAFITR#1, and Trauma#1

- Trauma #1: My (shaky) introduction to research (1969-1970)
 - Roger's challenge: Optimal estimation on Lie Groups
- RP#2 and FITR#1:
 - Fenway Park and Dynamic Systems on Finite Groups
 - The first half of Lesson#3



KOO#2 and Lesson #3

- Roger's "horrifying" and upsetting suggestion
 - What about the simplest Abelian Lie Group
- Lesson #3: It is easy to formulate really hard problems that, taken head on, are impossible to solve.
 - Much of the real creativity is in finding problems that push the envelope of what we understand and are **not** impossible
 - The thoughts of two individuals



Lesson #4-5, KOO #3-4, and Trauma #2

- Trauma#2 (Roger)



- KOO#4: Sanjoy Mitter

- Lesson#4: Scholarship is much more important than I thought
- A continuing responsibility: Imparting that to your students

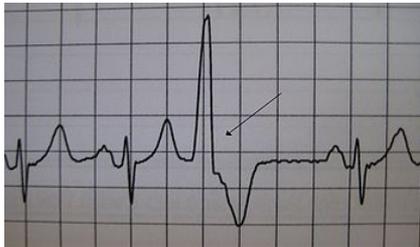


- KOO#3: Roger and Wally Vander Velde

- Lesson#5: Scientific writing is much more important than I thought
- A continuing responsibility: Imparting that to your students

BITRP#3-4, WYCTAFITR#2, & KOO#5-6

- BITRP#3 & FITR#2: A bit of chutzpah and a different challenge
- BITRP#4: Consulting at Draper Labs
 - KOO#5: Automatic detection of arrhythmias in EKGs



- KOO#6: Failure Detection for NASA's F-8 DFBW Aircraft
- Lesson#6: In practice, you don't have the same freedom in problem formulation that you have in developing theory
- Lesson#2 revisited and reinforced: The value of applied engineering in stimulating and guiding theory

WYCTAFITR#3: From Systems and Control to Signal Processing

- KOO#7: Al Oppenheim pays me a visit with two invitations



- *Signals and Systems* and its influences on my views of
 - Pedagogy
 - Scientific education
 - The importance of writing
- A plenary exploring relationships between my then current and then future fields
 - Lesson#3 revisited: It is the **hunt** that is often the best part
 - Lesson #7: While it might be a sign of a short attention span, I really **like** looking at relationships between fields and bringing perspectives from one to problems in the other

BITRP#5 and KOO#8/9:

Al O. introduces me to Schlumberger

- A 1st encounter: “What information are you trying to extract?”
- Encounter#2: Hearing a talk by this guy from WHOI

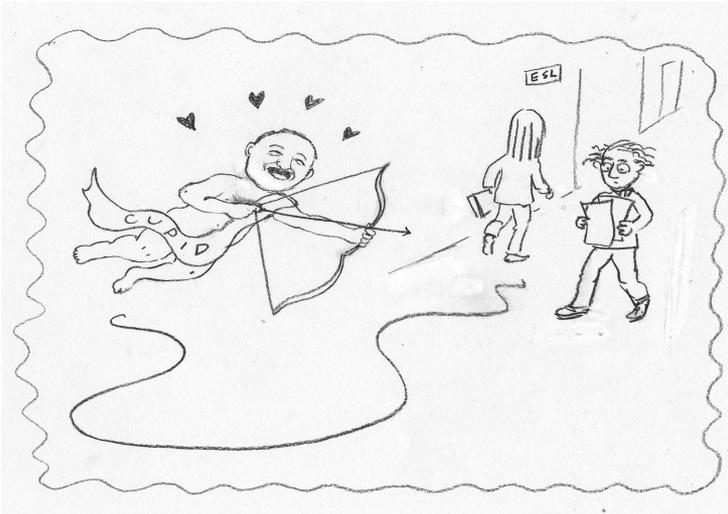


- A push into “goal-oriented” signal processing, and inference and extraction of geometric information for spatial phenomena
 - With thanks to Dave Rossi, Jerry Prince, and Peyman Milanfar



BITRP#6 & KOO#10-11

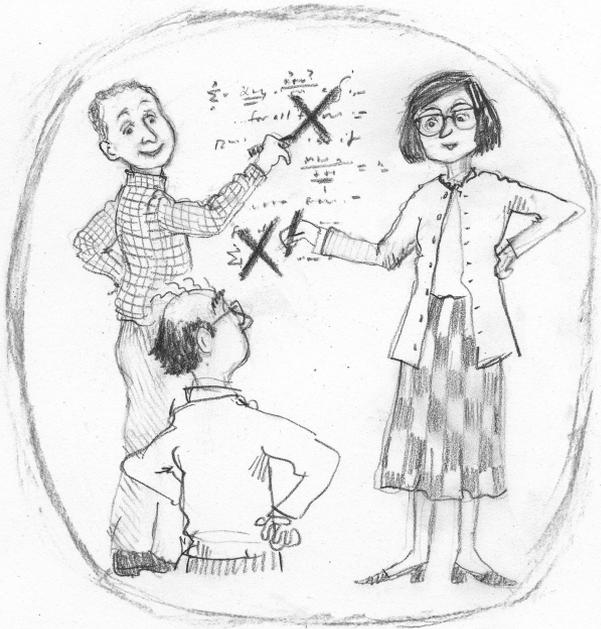
- Mike Athans, Nils Sandell, and ALPHATECH



- Lessons #2 & 6 revisited and amplified
 - A perspective on what it means to “deliver”
 - A complementary part of my professional life and an education

BITRP#7&8, KOO#12-13, and WYCTAFITR#4

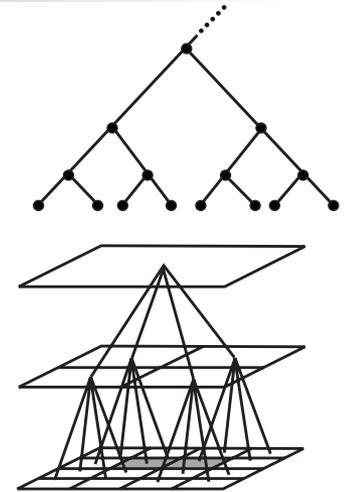
- Sabbaticals in Paris (1980-81) and Rennes (1988)
 - 1980-81: Convolutions and transforms in the City of Light
 - 1980-81 and then 1988: Albert Benveniste and Michelle Basseville



"Just one word ..."

Initial steps down Fork #4, and KOO#14-20

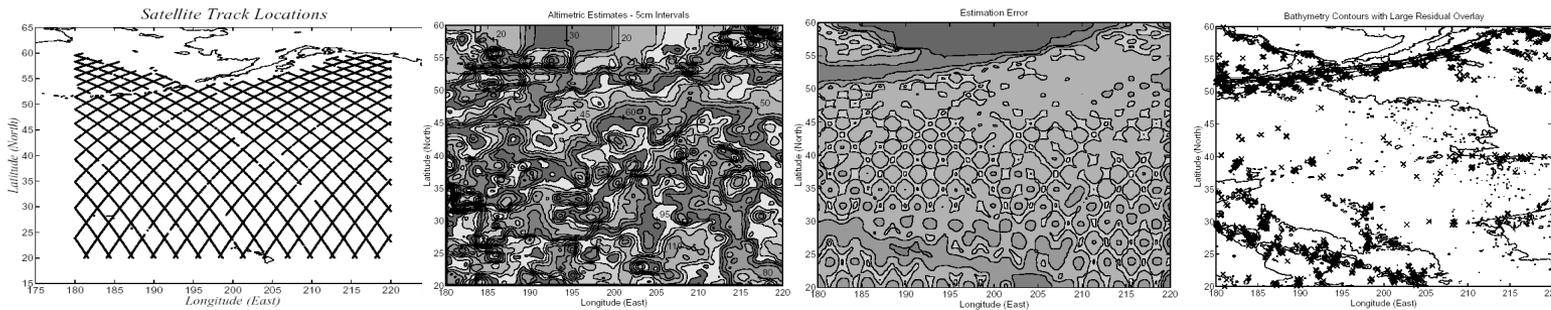
- Multiresolution “dynamic systems”
 - Models for multiresolution *synthesis*



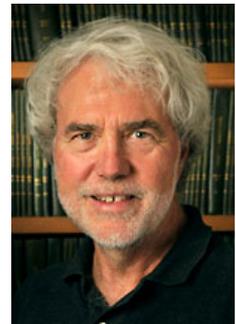
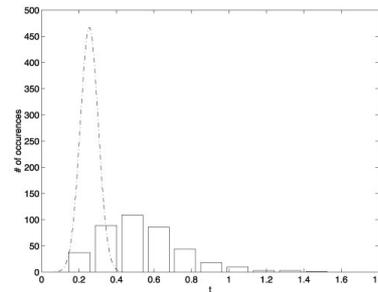
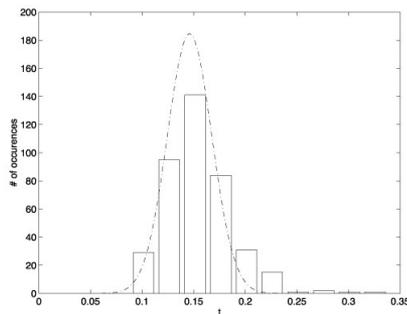
- (And eventually a rapprochement with wavelets)
- A variety of applications, by our group and by others
 - Image processing
 - Oceanography
 - Groundwater hydrology
 - Helioseismology
 -

F'rinstance (and KOOs#21-24)

- Exploiting the presence of multiple scales in the ocean

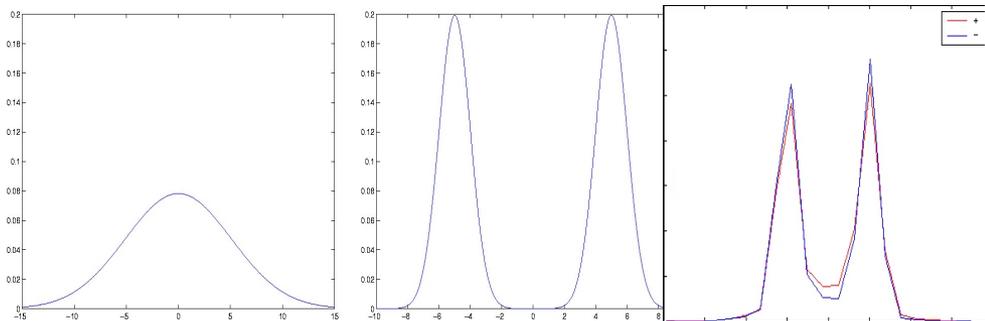
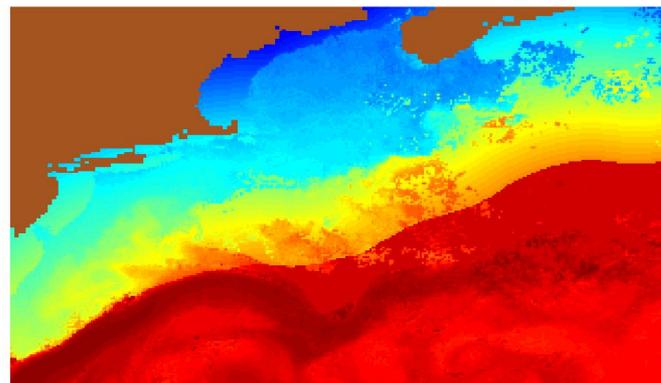
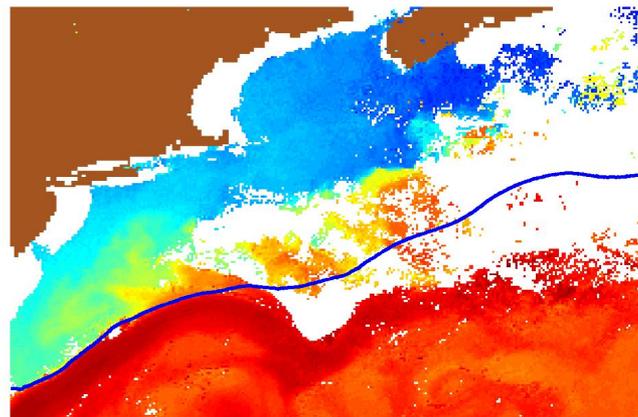
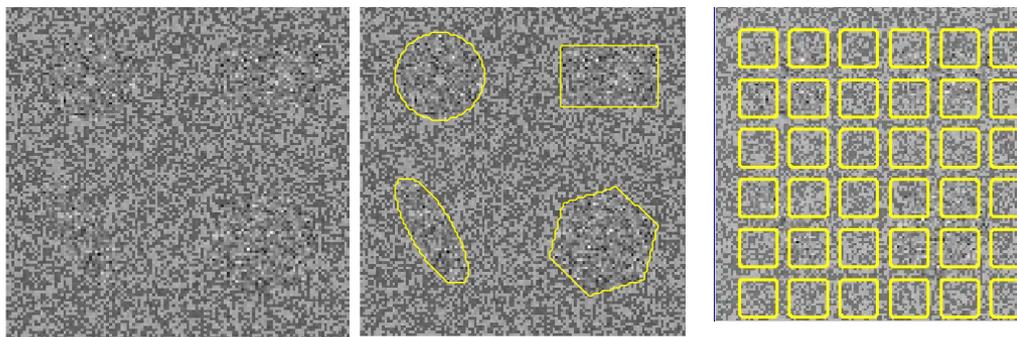


- Multiresolution models in groundwater hydrology



While walking down Fork #4, here comes WYCTAFITR#5 and KOO#25-29

- Tony YeZZi comes for a stay and curve evolution pays a visit



A realization, while strolling down Forks #4 & 5

- I was changing fields ***again***: Machine learning seemed to be my home
 - A realization assisted by KOO#20, with special thanks to Mike Jordan, Martin Wainwright, and Erik Sudderth

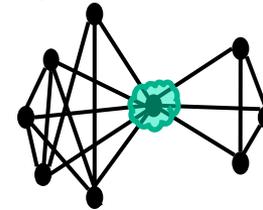
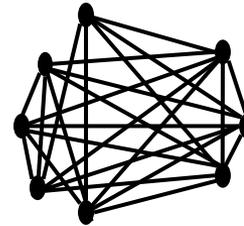
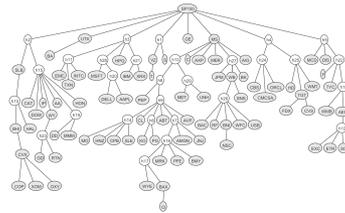
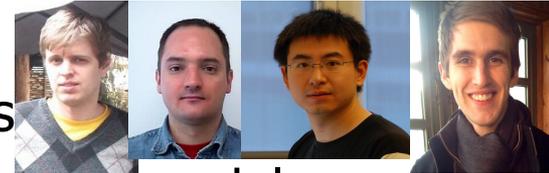


- Although I still am on speaking terms with systems, control, and signal processing
- A reprise of Lesson #7
 - I really like working across disciplines

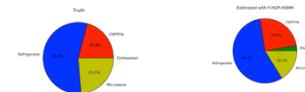
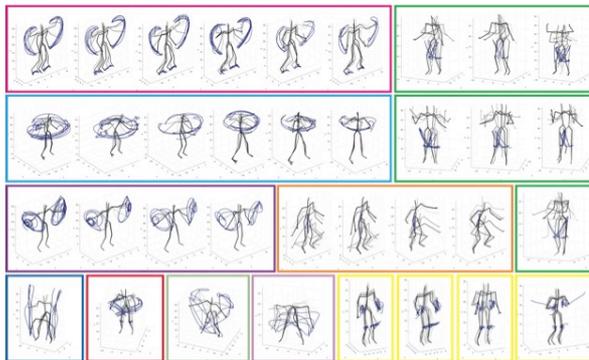
KOO#30 - ????: Continuing to profit from Lesson #8

- Lesson #8: Listen to and learn from your students, as they are the best "others"

- Beating the life out of Gaussian graphical models
- Some (I think) innovative ways to construct graphical models



- And forays into dynamic Bayesian nonparametric models



So, what are the final lessons?



