My Physics Odyssey

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Five Phases of a Research Career

• Enthusiasm
• Disillusionment
• Panic
• Perseverance
• Punishment of the Innocent
• Praise and honors for the non-participants.
enthusiasm
“We don't accomplish anything in this world alone... and whatever happens is the result of the whole tapestry of one's life and all the weavings of individual threads from one to another that creates something.”

– Sandra Day O’Connor
Role models are essential

• Margaret LA MacVicar
• Rainer Weiss
• Shirley Jackson
disillusionment
Kernels of wisdom #1

If you want to go fast, go alone, if you want to go far, go together.
-African proverb

Build your support structures...
panic
punishment of the innocent
perserverance
Kernel of wisdom #2

“You spend a lot of your life having people tell you to follow your passion. It’s nice advice, it’s heart-warming advice, it’s great advice — if you happen to have one that is very clear and obvious,”

• — Elizabeth Gilbert, author of Eat, Pray, Love

Follow your curiosity...

• Being a physicist you are learning how to ask the right questions when approaching a problem
• Build a solid educational foundation
• learn the art of morphing;
• hard technical knowledge combined soft skills are important;
Engineering Research Centers Program
Guiding Goals

• Create and sustain an integrated, interdisciplinary research environment to advance fundamental engineering knowledge, enabling technology, and engineered systems;
• Educate a globally competitive and diverse engineering workforce; and
• Join academe and industry in partnership to achieve these goals
An NSF Engineering Research Center: A Complex, Interdependent System

Leadership & Management

Research for Discovery/Innovation

Vision & Strategic Plan

Educating for Creativity & Innovation

Partnerships for Innovation

Funds, Equipment, Facilities

Industry/Users & Innovation Partners

Students, Faculty, Staff, Small Firms

Graduates Knowledge Innovations Curricula
Portfolio

CURRENT PORTFOLIO—Engineering Research Centers (ERC):
- **TANMS** (Translational Applications of Nanoscale Multiferroic Systems) **NERC**, UCLA
- **POETS** (Power Optimization of Electro-Thermal Systems) **ERC**, Univ. Illinois-Urbana Champaign
- **CBBG** (Center for Bio-mediated and Bio-inspired Geotechnics), Arizona State University
- **PATHS-UP** (Precise Advanced Technologies and Health Systems for Underserved Populations) **ERC**, Texas A&M University

GRADUATED PORTFOLIO—Engineering Research Centers:
- **CenSSIS** (Center for Subsurface Sensing and Imaging Systems) **ERC**, Northeastern Univ.
- **EUV** (Extreme Ultraviolet Science & Technology) **ERC**, Colorado State Univ-Ft. Collins
- **QoLT** (Quality of Life Technologies Engineering Research Center) **ERC**, Carnegie Mellon Univ.
- **MIRTHE** (Mid-Infrared Technologies for Health and the Environment) **ERC**, Princeton Univ.
- **LESA** (Lighting Enabled Systems & Applications—AKA Smart Lighting) **ERC**, RPI
praise and honor the non-participants
Kernels of wisdom #3

“It is impossible to live without failing at something, unless you live so cautiously that you might as well not have lived at all - in which case, you fail by default.”
— J.K. Rowling

Learn from your mistakes and failures...
• Save yourself time by also learning from other people’s mistakes
• It is not necessary to be good at everything—it is important to be perceived as bringing value;
QUESTIONS?

When I am working on a problem, I never think about beauty but when I have finished, if the solution is not beautiful, I know it is wrong.”

- R. Buckminster Fuller