

Statistical Leadership at GE

Quality & Productivity Research Conference

J.D. Williams, Ph.D.

Statistical Leader

GE Global Research



imagination at work

To Do List:

1. Introduce you to GE Global Research
2. Define “Statistical Leadership”
3. List characteristics of statistical leaders
4. Describe what we do at GE Global Research to cultivate statistical leadership
5. Give concluding remarks and initiate a dialogue

Introduction to GE Global Research

First US industrial lab

Began 1900 in
Schenectady, NY

Founding principle ...
improve businesses
through technology

One of the world's most
diverse industrial labs



Cornerstone of GE's commitment to technology

3,000 technologists strong



Global Research Center
Niskayuna, NY



John F. Welch Technology Center
Bangalore, India



China Technology Center
Shanghai, China



Global Research – Europe
Munich, Germany

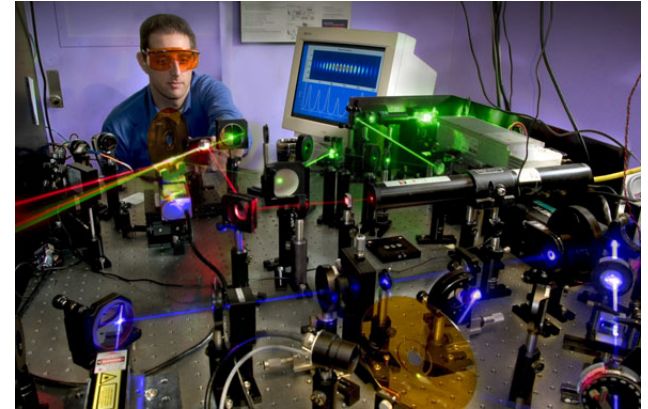
GE Global Research Center Niskayuna, NY

GE's world R&D headquarters

550-acre campus

1,800 technologists, majority
hold PhDs

Nearly 100 research lab
teams



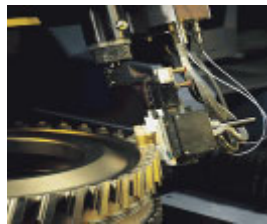
Spreading technologies across GE



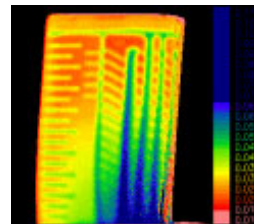
**digital
X-ray**



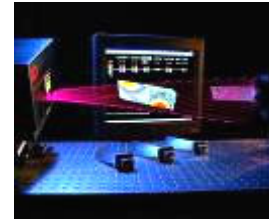
**Phased array
ultrasound**



**Eddy
current**



thermography



**optical
metrology**



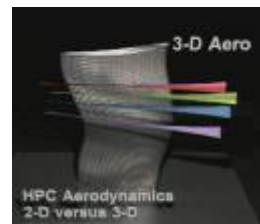
**new
coatings**



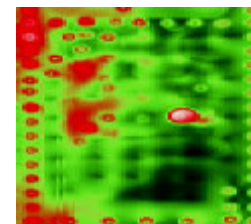
**new
composites**



**new metal
alloys**

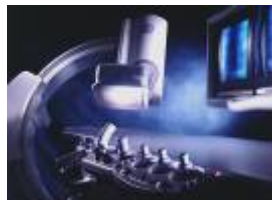


**computational
fluid dynamics**



**image
processing**

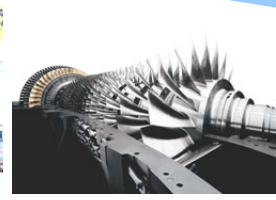
GE Businesses



Healthcare



Aviation



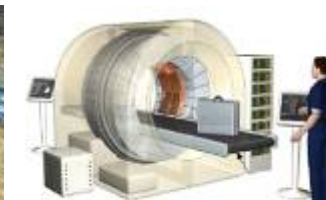
Energy



Water



**Oil &
Gas**



Security

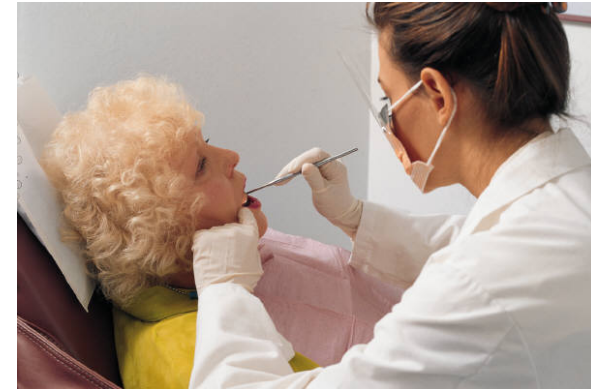


Definition of Statistical Leadership

- **Proactive**: Find the problem before it finds you
- **Versatile**: Function in a fast-changing environment
- **Converse intelligently in wide range of subjects**: business acumen, chemistry, physics, engineering, finance, marketing, risk
- **Diagnose** the technical tools needed to solve the problem
- **Communicate** clearly and fairly the results of an analysis:
Ask yourself “Could grandma understand me?”

A Statistical Leader is Proactive

- Definition of proactive: Acting in anticipation of future problems, needs, or changes
- Dentist role model (Gerry Hahn)
 - Status quo: Pulling teeth
 - New approach: preventative care
 - Result: lost business
 - ... but gained new business
- Do we really want to fix a broken DOE?
- Lesson: Be at the table when the DOE is created



A Statistical Leader Knows Business Acumen and Science/Engineering

Finance

Programming Languages

Chemistry

Materials Science

Accounting

Dynamics

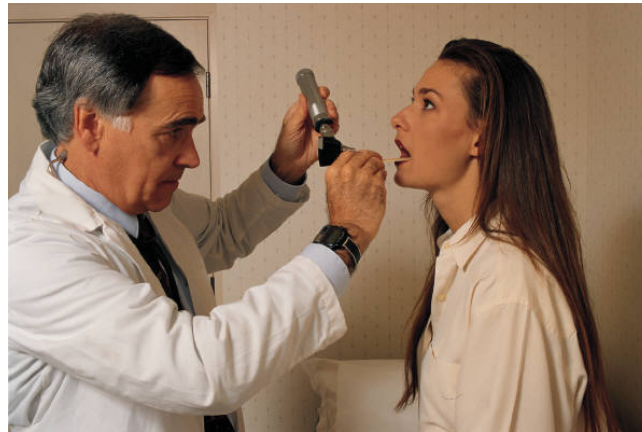
Risk

Electronics

Physics

A Statistical Leader Can Diagnose

- Family doctor analogy
- You may not necessarily be the one doing the analysis or be an expert in using the analytical tools, but you know which tools are needed
- Some tools needed to solve the problem may not be traditional statistical tools



A Statistical Leader Can Communicate

- ¡Hablen en Ingles por favor!
- J.D., what was your dissertation about?
 - A. “Heteroscedastic nonlinear dose-response profile monitoring and the distribution of Hotelling’s T^2 statistics based on the successive differences covariance matrix estimator”
 - B. “If I tried to explain it, you wouldn’t understand anyway”
 - C. “Statistical methods for making things better”



At GE Global Research

What we do at GE Global Research:

- Statistician Job title and job description
- Manager of statistics group is a statistician himself
 - Supports travel to conferences, participation in ASA, ASQ, etc.
- Statistician-lead projects and sub-tasks
- Project “ownership” by being a project team member
- Proactively pursue research ideas with businesses
- Six Sigma training
- GRC-wide quality leader is a statistician

GE Statistician Job Title / Description

Job Title: Statistical **Leader**

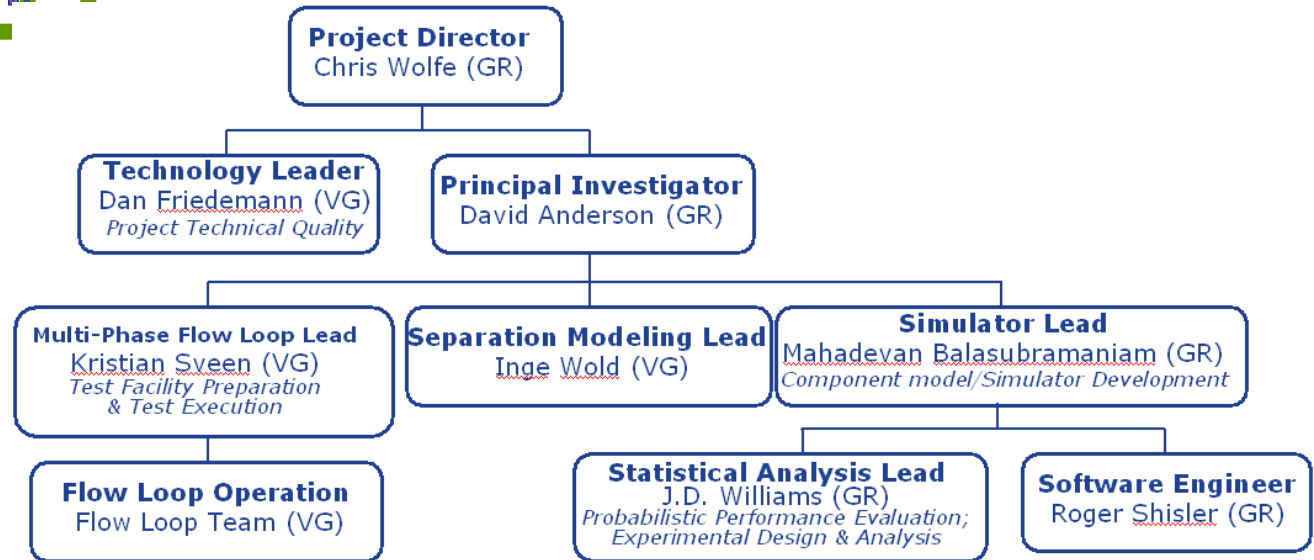
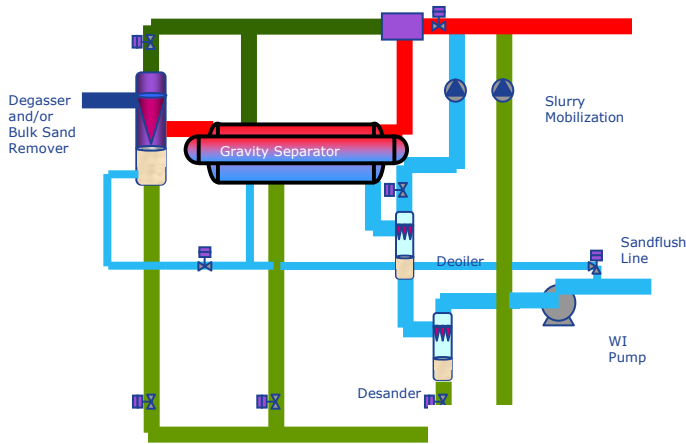
Job Description:

- Work on applied research projects on a global basis in conjunction with partners in GE business units.
- Work in a interdisciplinary team to determine methodologies needed, apply such methodologies (e.g. multivariate methods, time series, Bayesian methods, etc.) on quality, reliability, biotechnology, and financial research projects.
- Provide technical **leadership** as needed to ensure project success
- Effectively communicate technical data and results to other scientists as well as to management.
- Determining the required statistical toolkit and training for implementation and maintenance of statistical solutions within the businesses.



Example: Current Oil & Gas Project

Subsea Oil & Gas Processing System Integration Engineering



Statisticians as Problem Solvers

Project PI:

**“J.D., you are not here to do statistics.
You are here to solve problems.”**

To Summarize ...

1. Statistical leadership:
 - Proactive
 - Versatile
 - Conversant in business acumen
 - Diagnose the problem and know the right tools to use
 - Can communicate effectively
2. Statistical leaders are problem solvers, not number crunchers!
3. Statistical leaders take ownership of the project

Discussion

1. What does your organization do to promote statistical leadership?
2. How can we develop leadership among statisticians?
3. If you were assigned to give this talk, what would you say?