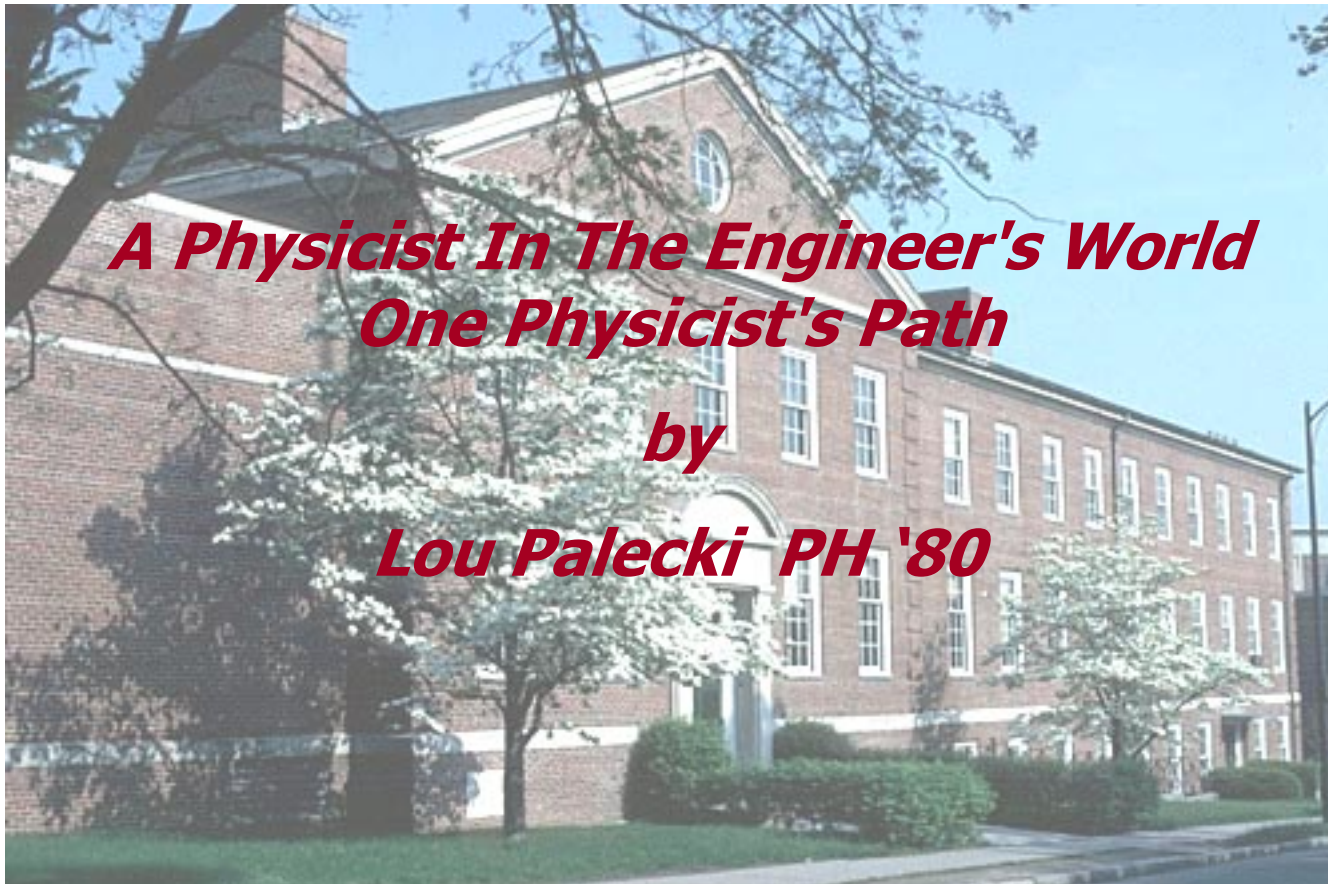


# **WPI** Physics Colloquium

---



# Outline Of The Discussion

---

- ▶ Overview Of My Career
  - ▶ One Example - A Work In Progress
- ▶ Planning Your Career
  - ▶ One Physicist's View
- ▶ Thoughts On Work
  - ▶ What I Wish WPI Taught Me
- ▶ Discussion - Q&A

# Goal Of the Presentation

---

- ▶ At the end of my time I hope you will:
- ▶ Start Thinking - *Now*
  - ▶ Try To Understand What You Want To Do
- ▶ Start Planning - *Now*
  - ▶ Identify The Steps To Your Career Goals
- ▶ Start Acting - *Now*
  - ▶ Your Time Is Finite, Linear and Irreversible

# My Career (to date)

---

## Education

- ▶ BS, Physics WPI 1980
  - ▶ MS, Industrial Engineering & Operation Research UMASS 1990
  - ▶ 12+ Courses At MIT, Northeastern
  - ▶ Dozens Of Training classes - QA, Management, Science & Technology
  - ▶ Defense Systems Management College
  - ▶ Honeywell Management Institute
  - ▶ A Small Mountain Of Books, Journals And Reports
- ▶ 'With all thyne getting, get understanding..'

# My Career (to date)

---

- ▶ Honeywell - Lexington, MA
  - ▶ Associate System Engineer (1980)
  - ▶ Systems Engineer (1982)
  - ▶ Sr. Systems Engineer (1984)
- ▶ Kollmorgen - Northampton, MA
  - ▶ Principle Systems Engineer (1985)
  - ▶ Manager of Systems Engineering (1987)
- ▶ Litton - Lexington, MA
  - ▶ Staff Engineer (1993)
  - ▶ Director of Special Projects (1995)
- ▶ Assurance Technology Corporation - Carlisle, MA
  - ▶ Director of Engineering (1996)

# Duties & Activities

---

- ▶ Specification Writing, Drawings, Test Procedures
- ▶ HW/SW Integration, HW/SW Test, Quality Assurance
- ▶ Assembly, Test, Field Support, Flight Engineer, Analysis
- ▶ Field Test Engineer, System Architect, Software Design
- ▶ Department Manager, Recruiter, Trainer
- ▶ Hire (& Fire), Proposal Manager, Team Leader
- ▶ Corporate Staff, M&A Work, Marketing, Trade Shows
- ▶ Supplier Management, Teaming, Strategic Planning
- ▶ New Venture Development, I&RD Management
- ▶ Patent & IP Support...

# **WPI** Physics Colloquium

---

## Career Planning

# Deep Thoughts

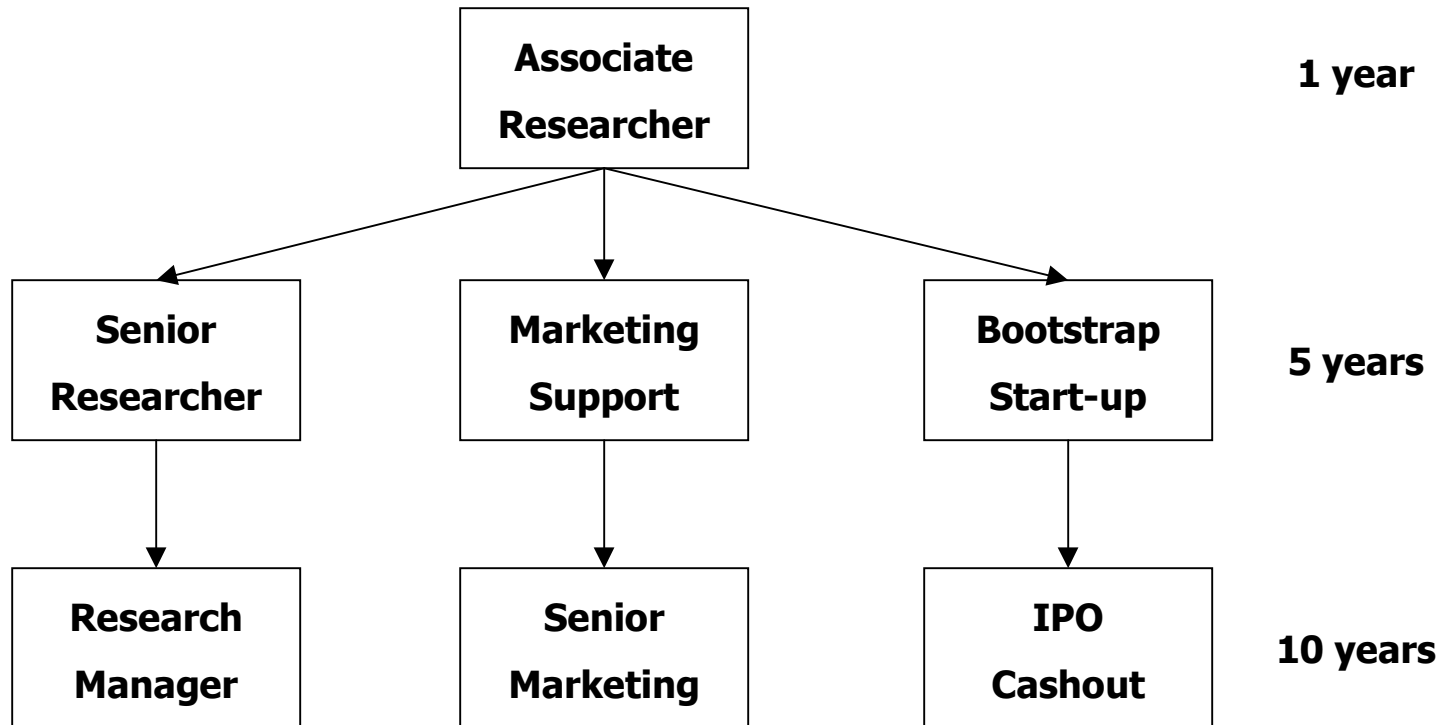
---

- ▶ The Hardest Thing First:  
*What Do You Really, Really Want To Do??*
- ▶ Meditation On Your Self-Motivation
- ▶ Write It Down - Revise It Often - Pull It Out To Remind
- ▶ No Right Way To Do It
- ▶ No Right Answer
- ▶ Expect Not Be Satisfied (ever!)
- ▶ Seek Balance - Work To Live, Don't Live To Work
- ▶ Recommend:
  - ▶ 7 Habits Books - Covey
  - ▶ What Color Is Your Parachute - Bolles

# Planning

---

- ▶ Develop A Career Plan : 1-5-10
- ▶ Look 1, 5 and 10 Years Out - Develop Alternatives



# Education & Personal Growth

---

- ▶ Science & Technology Move At Breakneck Speed
  - ▶ You Are Always At The Risk Of Being 'OBE' (Overtaken By Events)
- ▶ Growth Comes From:
  - ▶ Depth & Breadth Of Understanding
  - ▶ Experience & Judgement
- ▶ If You Stop Growing, You Become Less Valuable To Your Employer
- ▶ You Will Need To Continuously Learn - So Plan For It!
- ▶ Think Of Your Career As A Series Of Sub-Careers You Need To Train For
- ▶ A Critical Factor In Choosing A Place To Work

# Academic v. Industrial Careers

---

- ▶ A Major Fork In The Road
- ▶ Pros & Cons To Each Path
  - ▶ In Some Ways, At The Highest Levels, The Paths Converge
- ▶ Academics Offer:
  - ▶ Collegial Atmosphere
  - ▶ Intellectual Freedom
- ▶ Industry Offers:
  - ▶ Faster Pace
  - ▶ More Diverse Opportunities
- ▶ Investigate Through The People Around You
  - ▶ Professors, Alumni, Family...

# Communication Skills

---

## ▶ Written

- ▶ Practice, Practice, Practice
- ▶ Clear, Concise Prose
- ▶ The email Trap

## ▶ Verbal

- ▶ More Practice
- ▶ Absolute Necessity For Advancement
- ▶ Persuasive, Direct And Clear

- ▶ You Are Truly Part Of the Information Age -  
Communication Skills Are The Vehicle For Your Ideas

# Mentors & Networks

---

- ▶ Find A Mentor (or two)
  - ▶ Not Your Supervisor
  - ▶ In Or Out Of Your Sphere - Does Not Matter
  - ▶ Ask Directly & Don't Abuse The Privilege
  - ▶ They Are The 'Go To' People In Your World
- ▶ Start Your Network
  - ▶ Be Discriminating
    - ▶ Out Of 100 People You Know - Maybe 5 Are Network Quality
  - ▶ Big Difference Between Contacts & Network Members
  - ▶ 'Seven Degrees Of Separation'
  - ▶ Professional Societies
  - ▶ Networks Take Constant Maintenance

# Scientist v. Engineer

---

- ▶ Another Interesting Fork In Road
- ▶ Cultural Distinction
  - ▶ Theory v. Application
- ▶ Depth Of Understanding
- ▶ Interrelationships And Generalism
- ▶ Societal Views Of The Relative Net Worth
- ▶ Explore What It Means To You
  - ▶ The Discoverers - Boorstin
  - ▶ Genius - Gleick
  - ▶ Introspective Engineer - Florman

# Generalist v. Specialist

---

- ▶ You Start Your Career With Some Direction (I hope)
- ▶ Your Path Is Always Moving Towards Or Away From Specialization
- ▶ Your Employer Has A Vested Interest In Making You Specialized (at least the poor ones)
- ▶ Career Longevity and Satisfaction Comes From Being 'Fungible'
- ▶ Be Cautious If You Are a Specialist

# The Job Process

---

## ► Research

- The Company & The Competition
  - WWW Resources Are Immense - No Excuses

## ► Resumes

- It Represents You In Your Absence
- No Excuse For A Bad Resume

## ► Interviews

- Know Why You Are There - And Express It
- Do Not Waste Time - If It Is A Mismatch, Say So And The Company Will Be Grateful

## ► Follow-up

- If You Are Interested - Express It - It May Tip The Scale

## ► Notebook

- Keep A Job Notebook - Diary, Notes, Contacts...

# **WPI** Physics Colloquium

---

Thoughts on Work  
(What I Wish WPI Had Taught Me)

# 'Everything is a System'

---

- ▶ Whatever Your Task Is, It Is Part Of A Larger System
- ▶ Understand The Context
- ▶ Physical, Organizational, Hardware, Software... All Systems Come In Myriad Shapes And Forms
- ▶ The Value Of A System Is Proportional To How Well It Encapsulates Complexity and Its Relationship (Interfaces) To Other Systems
- ▶ Recommend:
  - ▶ Systems Engineering: Blanchard, et.al.
  - ▶ Systems Architecting: Rechtin

# 'Success Is In The Eye Of The Beholder...'

---

- ▶ Success Is Defined By The Customer, Not The Designer
- ▶ Know The Requirements:
  - ▶ Shall, Will & May
- ▶ Always Document The Expected Outcome - It Is Your Measure Of Success
- ▶ Be Ethical - Success At Someone Else's Expense Has No Value
- ▶ Before The Test, It's Opinion; After, It's Obivious

# The 'Three Way Trade'

---

- ▶ There is only one tradeoff you will deal with in your career:

## **Schedule v. Performance v. Cost**

- ▶ You can control any two, and the third is determined for you
- ▶ A corollary: you will run out of one (if not all) of these three variables if you do not have firm requirements

# 'Everything is a Thermometer'

---

- ▶ Never Forget The Law Of Unintended Effects
- ▶ Pay Attention To The Details Of The Design And The Environment
- ▶ Because It Works In One Environment Does Not Mean It Works In Any Other
- ▶ Thermal Effects Can Be Manifest In (almost) Any Type Of Error

# 'Money Makes The World Go Around...'

---

- ▶ Money/Economics Is/Are A Design Element
- ▶ Remember:
  - ▶ You Are Paid For What You Do
  - ▶ Your Customers Pay For Your Products
  - ▶ Your Suppliers Expect To Be Paid For Their Materials
  - ▶ Your Grant Money Is Not A Permanent Flow
  - ▶ and so forth...
- ▶ Always Be Aware Of The Economic Effects Of Your Decisions
  - ▶ 80% Of The Cost (of a system/project) Is Set In The First 20% Of The Time (Economic Application Of Pareto's Law)

# 'The Best Laid Plans...'

---

- ▶ The Sequel To The Requirements
- ▶ Plan Everything - There Is No Such Thing As The 'Immaculate Plan'
- ▶ The Moment A Plan Is Finished, It's Obsolete
- ▶ Break It Down
  - ▶ Mile - Stones
  - ▶ Inch - Pebbles
  - ▶ Micron - Grains
- ▶ Every Task Must Have A Measurable, Tangible Output

# 'Computers Are Your Friend...Sort Of'

---

- ▶ Content Is Key
- ▶ A Computer Is A Tool, Nothing More (a powerful one, though)
- ▶ Elegant Documents Based On Poorly Constructed Thought Are No More Than Pigs In Dresses
- ▶ Plan Your Use Of All Your Tools To Maximize Your Your Output
- ▶ Outline Everything - Outlines Are Merely Plans For Your Documents
- ▶ Recommend:
  - ▶ Visual Display of Quantitative Information - Tufte

# 'KISS Really Is Better...'

---

- ▶ Simple Solutions Are Generally The Best Solutions
- ▶ Scaling A Small, Working System Has A Good Chance Of Success
- ▶ Reliability Is Inversely Related To Complexity
- ▶ The Best Interfaces Do Not Cut Across Complexity
- ▶ Challenge Extreme Requirements

# 'You Don't Know What You Don't Know...'

---

- ▶ You'll Make Mistakes - Get Over It & Learn From Them
- ▶ Knowing When And Where To Look It Up Is A Critical Skill
- ▶ Ask Questions - Do Not Assume
- ▶ Restate The Answer & Confirm
- ▶ There Is No Such Thing As Too Much Communication
- ▶ Keep Good Notes

# Conclusions

---

## ► IMHO:

- A WPI Physicist Has Several (Marketable) Advantages:
  - Problem Solving (The Scientific Method)
  - Fundamental Principles Applicable Everywhere
  - Understanding Relationships
  - The Project Mentality
  - WPI's Reputation

*Now Is The Time For You To Write Your Own Plan!*

# Contact Data

---

- ▶ Lou Palecki
- ▶ Assurance Technology Corporation
- ▶ 84 South St.
- ▶ Carlisle, MA 01741
- ▶ V: 978-369-8848
- ▶ F: 978-369-3368
- ▶ E: [palecki@assutech.com](mailto:palecki@assutech.com)