

Engineering, Ethics and Society: Introduction and Overview

- Log on to your wi-fi or Internet
- Go to <https://onlinepoll.ucla.edu>
- Wait for further instructions

Dr. Gershon Weltman. gweiltman@ee.ucla.edu

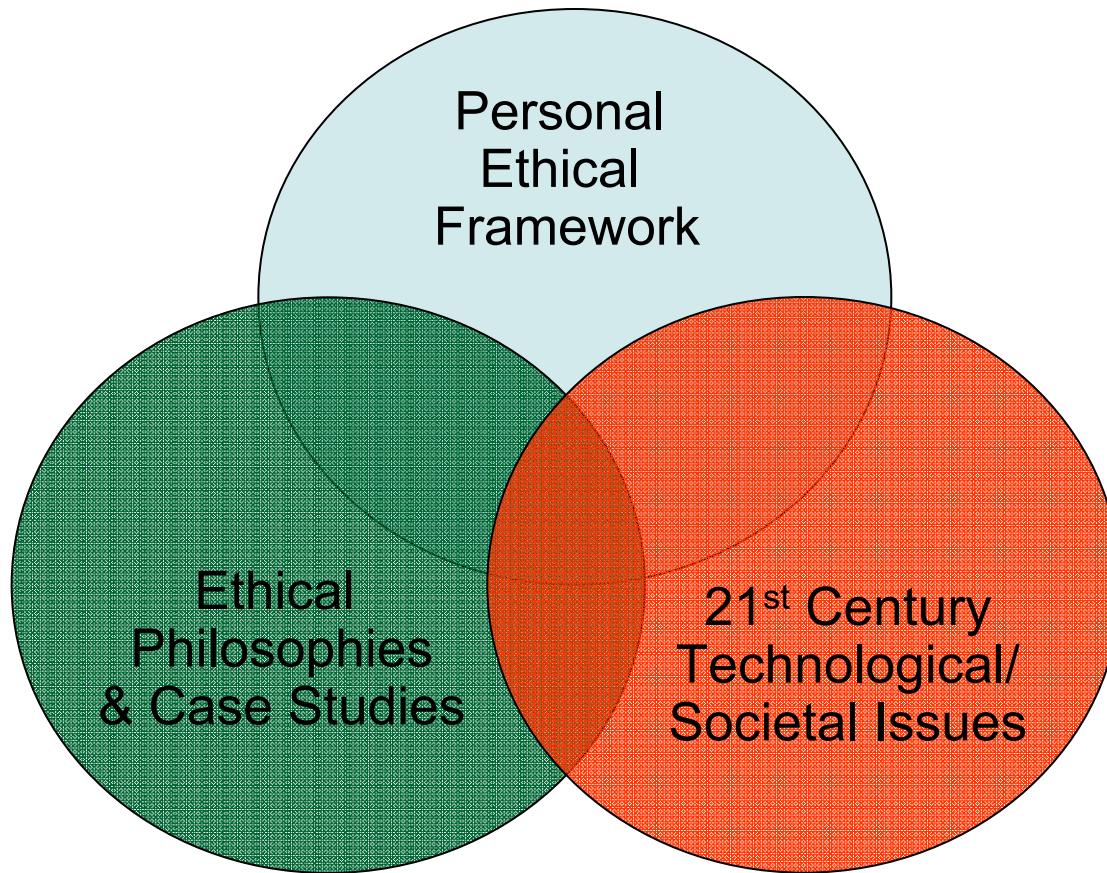
Dr. Donald Browne, browne@seas.ucla.edu

Engineering 183EW, UCLA SEAS
Lecture 1

Lecture Contents

- Course Overview & Objectives
- Importance of History
- Value of Engr 183EW
- My Background & The Role of Simulation
- Course Structure & Rationale
- The Two Cultures
- Ethics & the Engineering Profession
- Challenge and Opportunity
- *Student Outlook (onlinepoll)*

Course Overview



We are going to cover a LOT of ground as efficiently and coherently as we can

Course Objectives

- Prepare students to help identify and address *society's critical technical issues* as highly qualified *and ethical* engineering professionals,
- Help students build a *Personal Ethical Framework* with which to identify and apply the ethical principles affecting these issues,
- Provide an understanding of *how technology and society have influenced each other* during important historical periods,

The Importance of Historical Context

1. Knowing how technology and society have interacted in the past gives us a *framework of understanding* for current issues
2. Equally important, to recognize where we are now, and decide where we should be going, *it is essential to know how we got here*

"Those who cannot remember the past are condemned to repeat it."

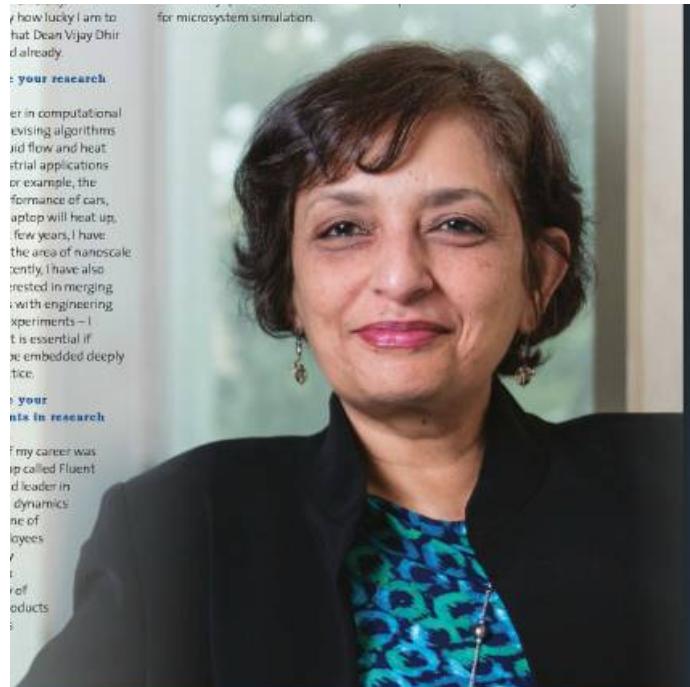
George Santayana
Spanish and American Philosopher
1863-1952

3. But there are some periods in the past that we might like to repeat -- in an up-to-date way -- and these are also worth remembering!

Specific Course Objectives

- Prepare students to help address the world's *critical socio-technical issues* as engineering professionals,
- Help students build a *Personal Ethical Framework* to identify the moral and ethical principles affecting these problems,
- Provide an understanding of how technology and society have interacted up to now and will likely do so in the future,
- Examine specific critical *contemporary societal issues* that involve both technology and ethical factors
- Provide experience in successfully *researching, analyzing and describing* contemporary technical/ethical problems
- Improve ability to write and present *high quality engineering memos, papers and reports*
- Provide *guidelines and methodology* for making *ethical engineering decisions*
- Lay the groundwork for continued individual study

183EW Will Complete You As Engineers...



“Engineering schools must give students hard technical skills. But also breadth. Students must be able to appreciate the *social, historical and political* contexts in which they practice their profession so that they can make real impact”

Dr. Jayathi Murthy

Our Engr183EW course helps fulfill former SEAS Dean Murthy’s vision of what a world-class engineering education should include.

...Help You Value Your Contribution...

The products of your mind are the most precious things you own, that you possess.

*And you must protect them, and must not do wrong with them,
You must do the right thing.*

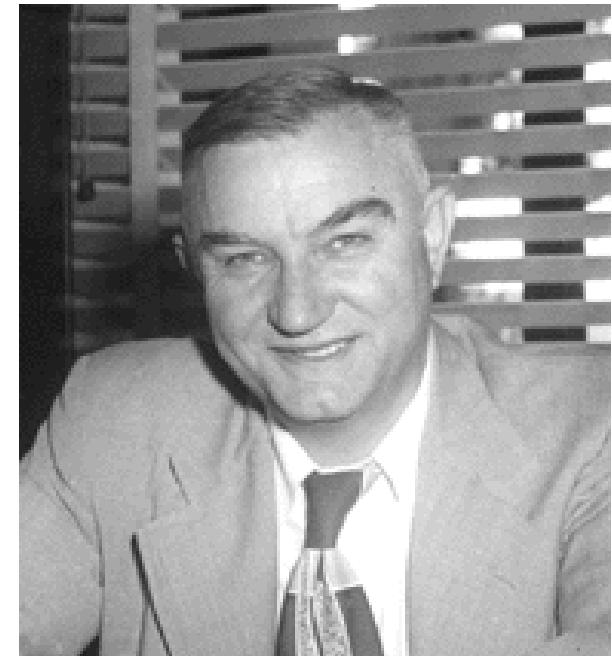
***You must always remember that the products of your mind can be used by other people either for good or for evil,
And that you have a responsibility that they be used for good.***

You see, you can't avoid this responsibility, unless you decide to become an intellectual slave,

And let someone else make all of these value judgments for you.

And this is not consonant with our democratic system in this country.

You must accept the responsibility yourself, for yourself, and for others.



Llewellyn M.K. Boelter
Dean, UCLA SEAS 1963

...Provide a Guide to Action...



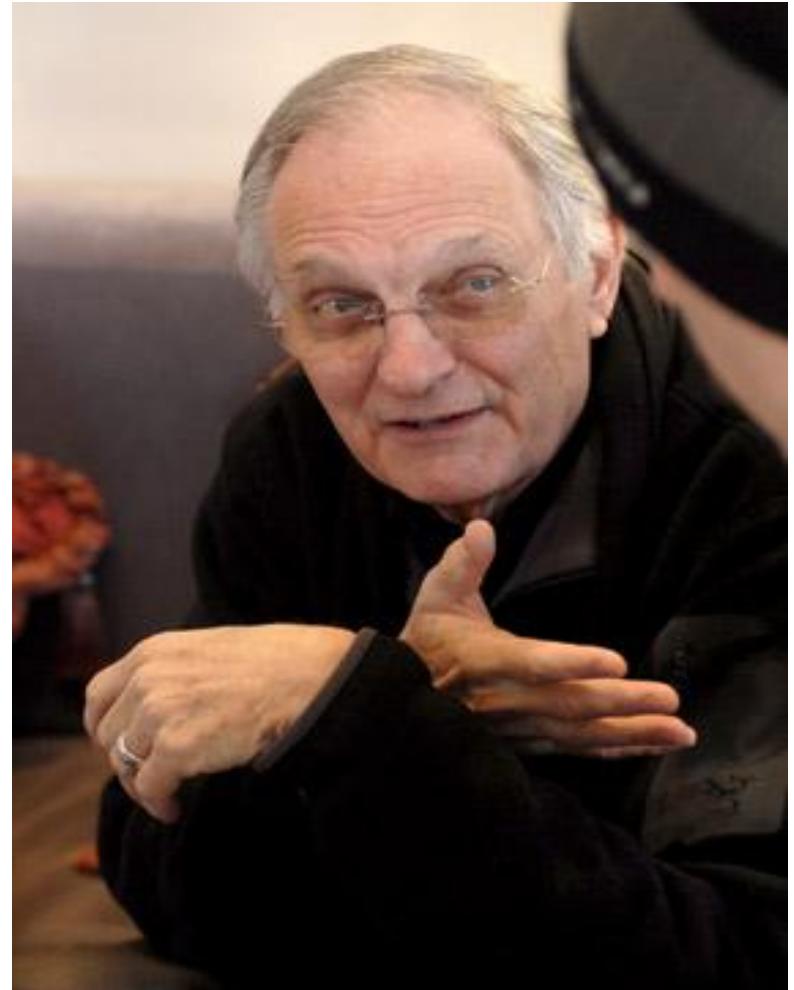
“Doing what’s right isn’t the problem. It’s knowing what’s right.”

Lyndon Baines Johnson
36th President of the United States

.. Influence Your Personal Life...

“When you discover that you have values, it makes things much simpler.”

Alan Alda
Actor and Activist



...Show You a Direction...

“Touch people with the *better angels of your nature.*”

Abraham Lincoln
16th President of the United States



...Help Understand What it Takes...



"Courage is the most important of all virtues, because without it we can't practice any other virtue with consistency."

Maya Angelou
Poet and Author

...Do Personal as well as General Good....

“If you act properly, your actions allow you to be psychologically integrated now, and tomorrow, and into the future, while you benefit yourself, your family, and the broader world around you.”

Jordan B. Peterson, Ph.D.
Professor of Psychology

Author of “12 Rules for Life: An Antidote to Chaos”



...and Fulfill an Important Goal!

“Intelligence plus character - that is the true goal of education.”

Rev. Martin Luther King, Jr.
Civil Rights Leader



In Summary

Our goal in Engr 183EW is to give you knowledge about ethics and societal issues that will help make you

a more thoughtful engineer now –

and also set you on a path of

lifelong learning

about the critically important interactions among science, technology and the evolving needs of society.

Ethical Example: The Gorilla or the Child?



Harambe the gorilla at Cincinnati Zoo with child who fell into his enclosure

While most of our ethical case studies will involve engineering problems, ethics knowledge can help you define and deal with daily problems as well.

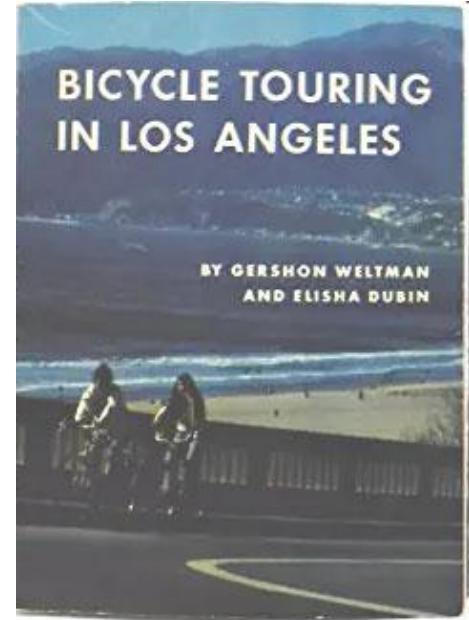
My Background

- Preparation: Engineering Education
 - B.S., M.S. & Ph.D. @ UCLA SEAS
 - Postdoctoral Fellow @ Weizmann Institute, Israel
- Act 1: UCLA Engineering Faculty
 - Teaching
 - Machine and Environmental Biotechnology
 - Humanities for Engineering Students
 - Research -- Human Performance Underwater
- Act 2: Defense Industry
 - Perceptronics, Inc; AI-Based Decision Support, Distributed Interactive Simulation
- Act 3: Do It Again
 - Perceptronics Solutions, Inc; AI Applications to Decision Support, Manned-Unmanned Systems, Performance Training and Assessment
 - SEAS Lecturer: Engineering, Ethics and Society



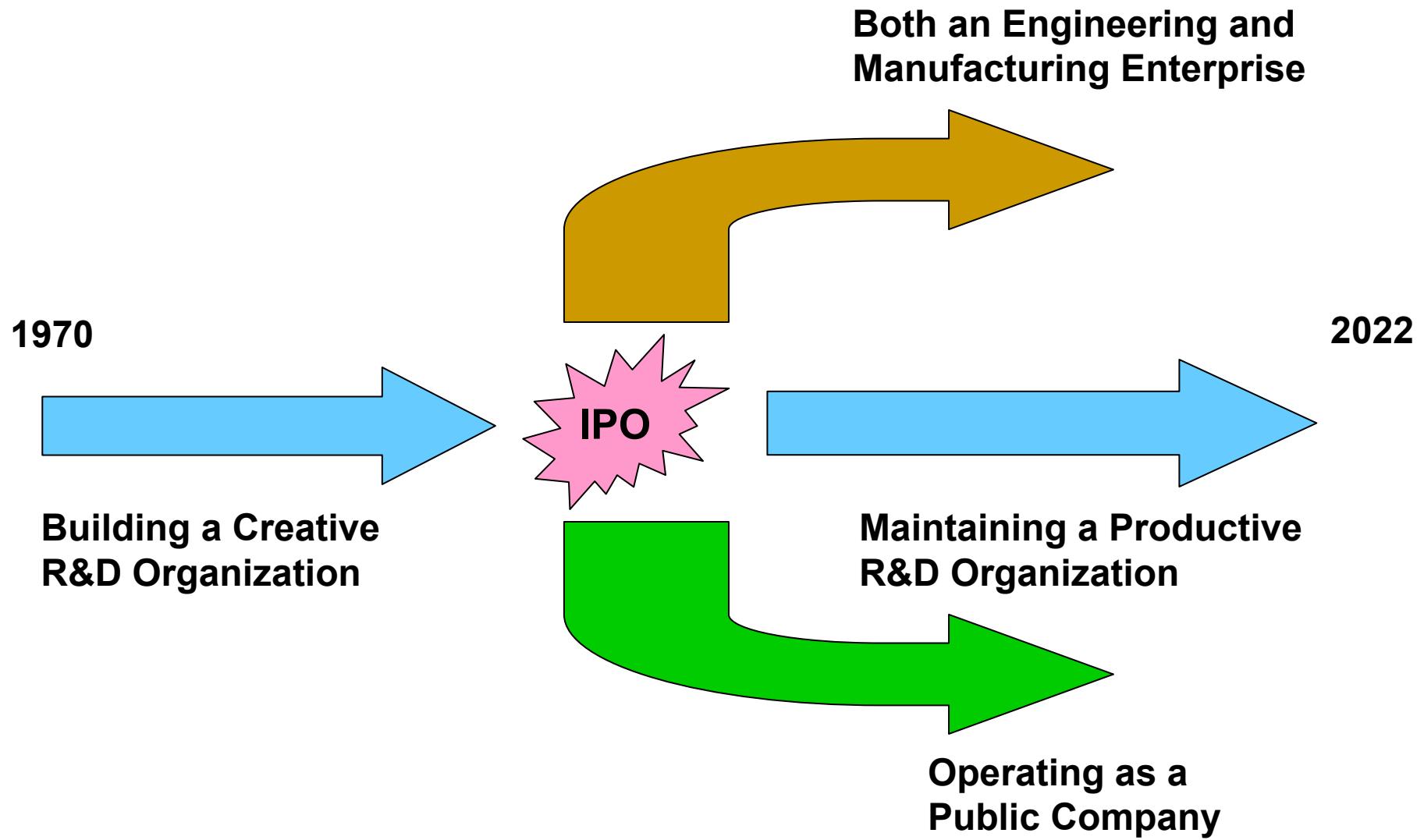
Other Personal Items

- Lifestyle Interests
 - Mind: Books, TV, movies, art, jazz, discussion
 - Body: Road bicycling, “slogging,” weights, Pilates
- Roots of My Ethical Structure
 - Parent’s Political Idealism
 - Extended Family’s Ethnicity/Religion
 - Boy Scouts of America
 - Sports and Peer Groups
 - Education: Formal and Informal
 - Experience: Teaching, Business, Travel
 - Continual Self Examination



“The unexamined life is not worth living.”
Socrates, ~400 BC

Perceptronics Timeline

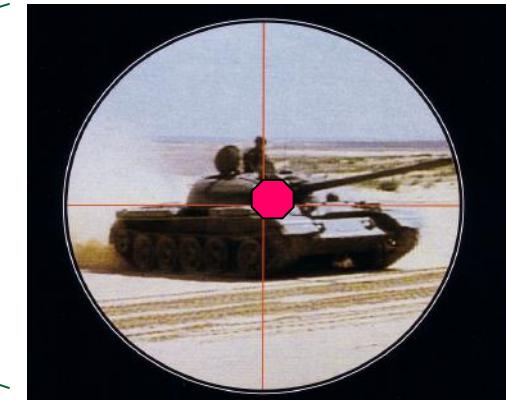


A Lot Depended on This Technology



Pioneer Industrial Videodisc Player ~1976

1st Product: Videodisc Gunnery Trainers



Filmed Scenarios

- Real Targets
- CIG Firing Effects
- True Challenge

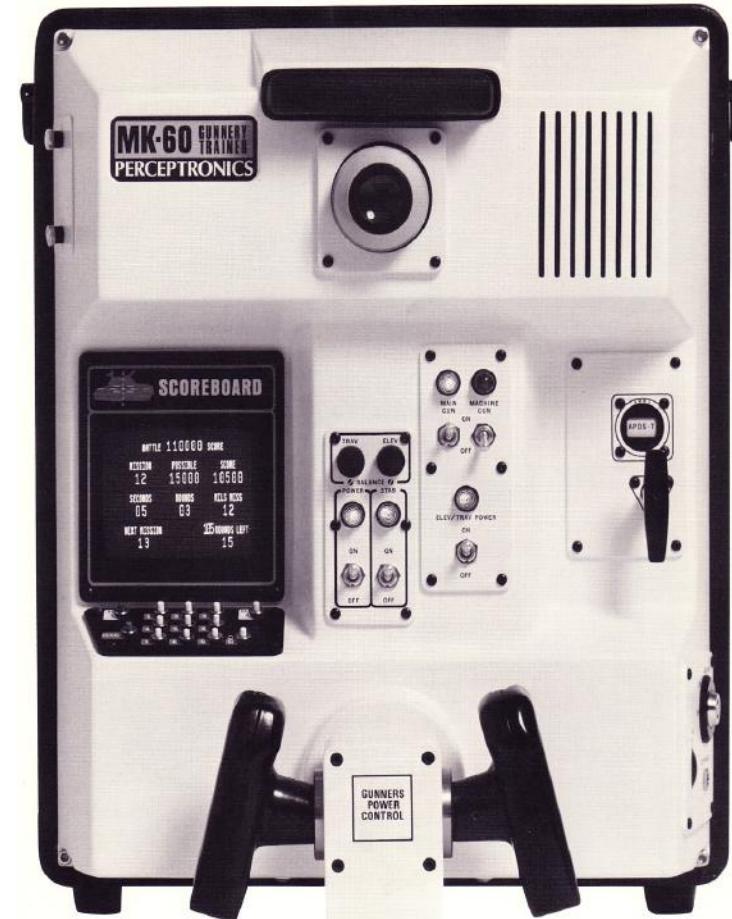
Laser Videodisc

System Features

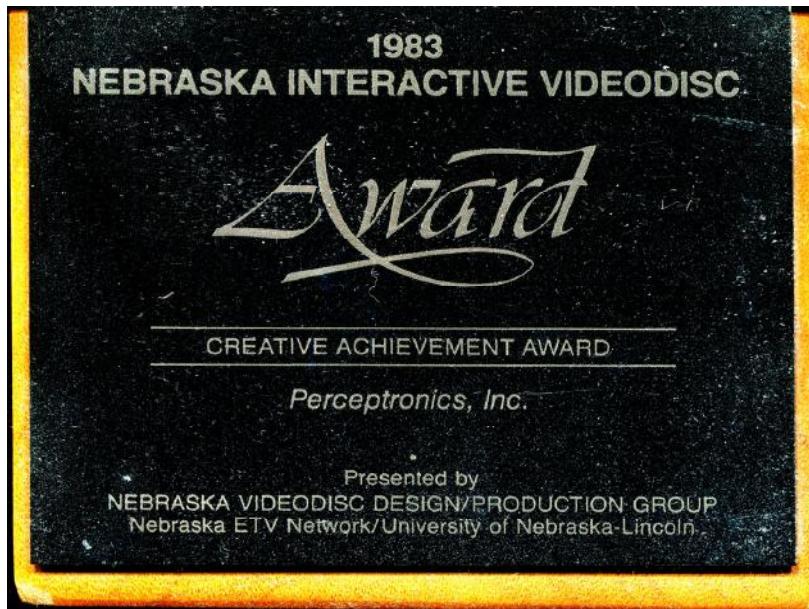
- Low-Cost
- Portable
- Training Transfer

New Ideas in Military Simulation

- Selective Fidelity
- Entertainment
- Industrial Design
- Rapid Prototyping
- Affordability: COTS Components
- Distribution to Units
- Family of Products

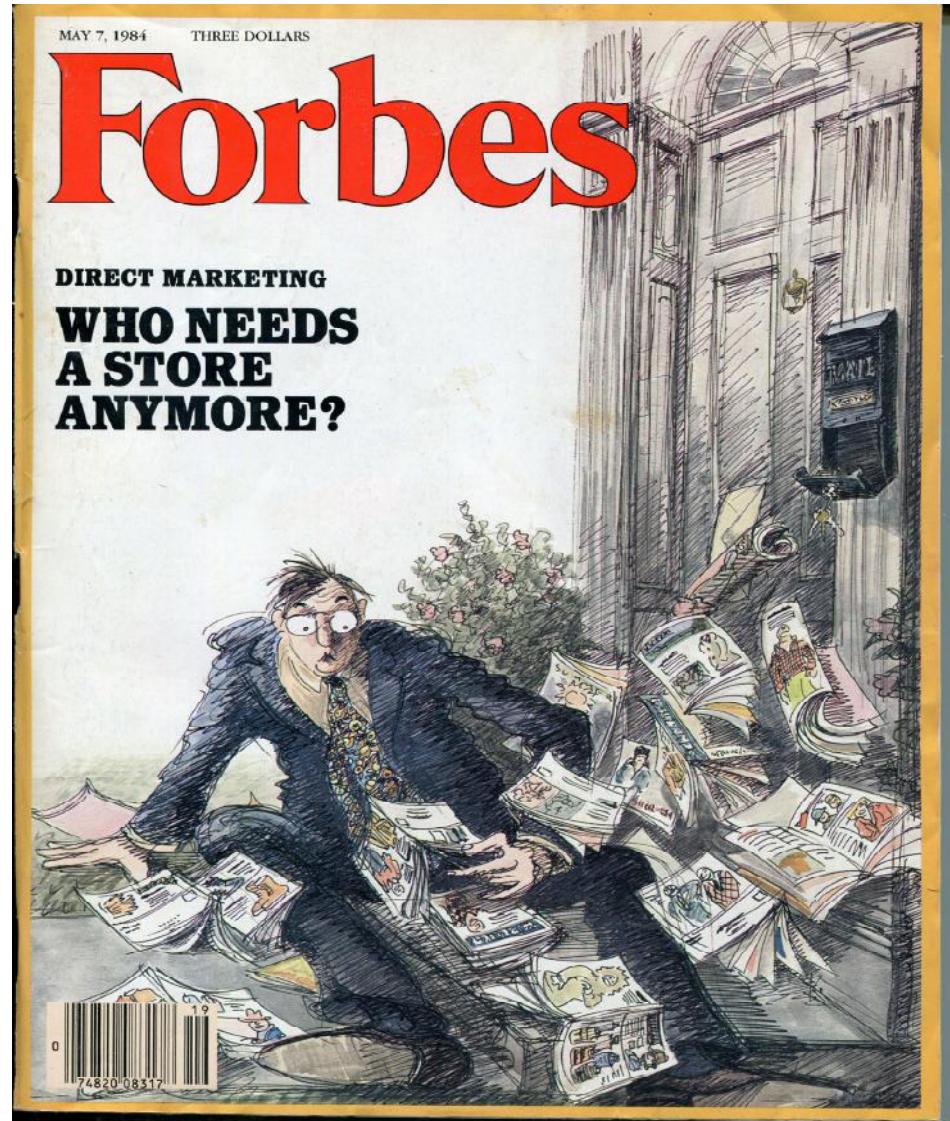


Recognition

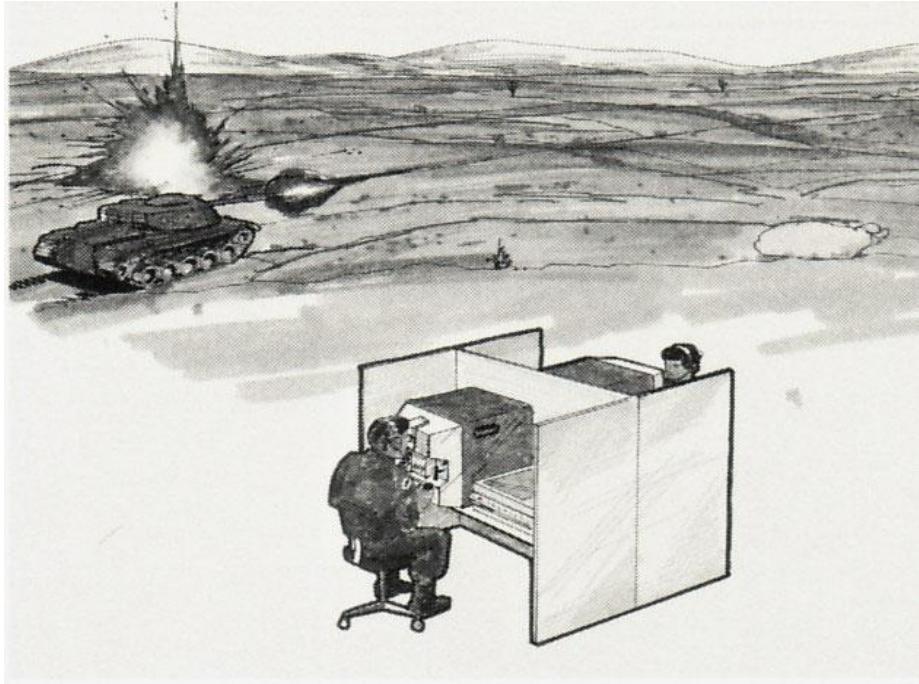


1983 Creative Achievement

May 7, 1984



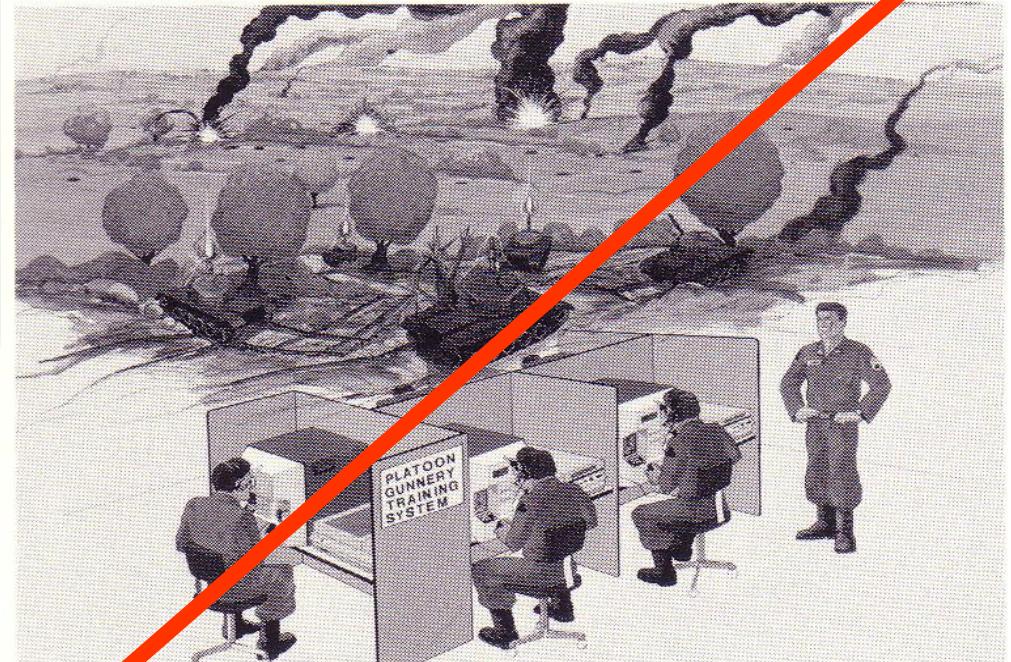
Extensions of Concept



Proposed “Platoon” Configuration

“Shoot Off” Configuration:

- Dramatically Different Experience
- Enthusiastic Customer Response



Bigger Extension: 3D Virtual Battlefield



SIMNET = Full-Crew Simulator Network (1st MMOG)

SIMNET Full-Crew Tank Simulator



Production Objectives:

- Low Manufactured Cost
- Modular/Reconfigurable

Design Objectives:

- Exercise Features Only
- Feeling of “Tankiness”



SIMNET Original Virtual World



Air bursts are exploding across the scene as 25mm rounds are walked into the BMP (center right) and smoke from a 500 lb. bomb lingers behind the tree line.



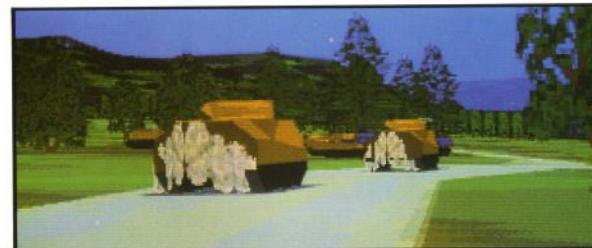
A low power view through a gun sight shows a column of T72s coming down the valley, air bursts above, and one destroyed tank still smoking.



A high power view of the same scene through the sight brings the destroyed tank into higher magnification.



Three artillery rounds have landed among the M1s who have taken slight cover under the scattered trees. An AH64 hovering to the right is threatened by the ground bursts and the single air burst at tree-top height.



Two M2s travel a dirt road, throwing small dust clouds (at low speed) as they approach a resupply activity seen in the trees to the left.



A battle seen from the BC's center view port in an M2 (note the chain gun barrel right of center at bottom of view); coming up a slight rise we find that air bursts have destroyed the enemy tank to the left.

SIMNET Immediate Success...



+



=



The first four SIMNET M-1 tank simulators were installed at the US base in Grafenwoehr, Germany and loaded with the terrain of the forthcoming 1987 Canadian Army Trophy (CAT) tank gunnery competition. "CAT," held every two years, was considered the "World Series of Tank Gunnery."

Following its training on SIMNET, the US Army platoon won the prestigious CAT competition. This was the first time the US had even placed. The highest-scoring M-1 tank at the 1987 Canadian Army Trophy (CAT) competition is shown at an indoor 2nd Brigade facility.

This is the Canadian Army Trophy (CAT) that was awarded to the winning US Army tank platoon at Grafenwoehr in 1987. The unprecedented victory dramatically showed the value of SIMNET training for coordinating troop actions as well as improving precision tank gunnery.

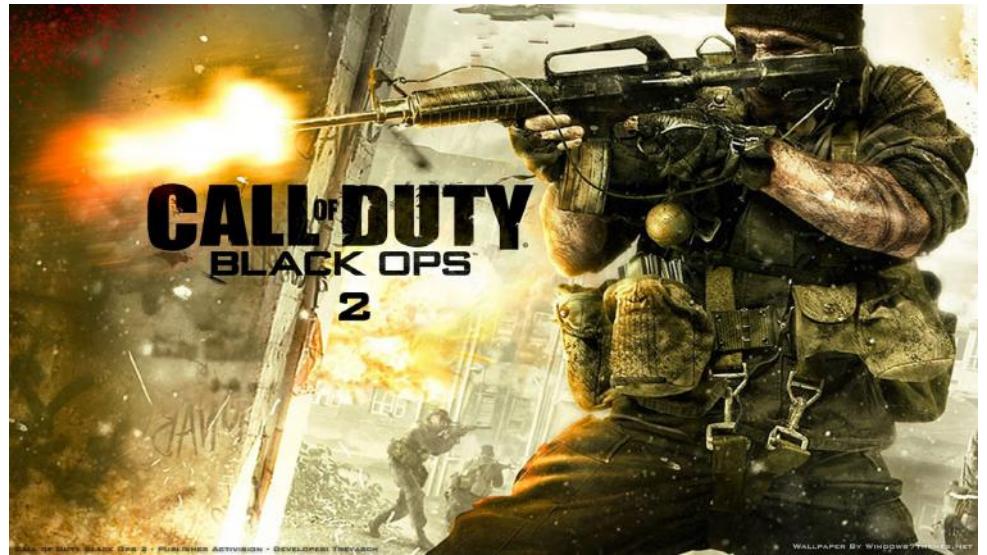
Leads to Large-Scale Acquisition, Training...

.... Continued Technical Improvement...



...and Offsprings

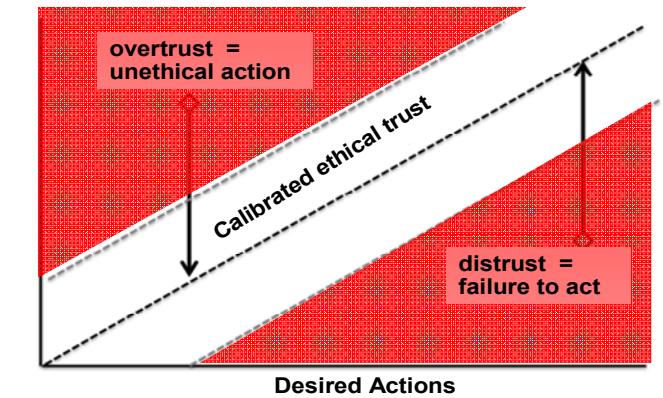
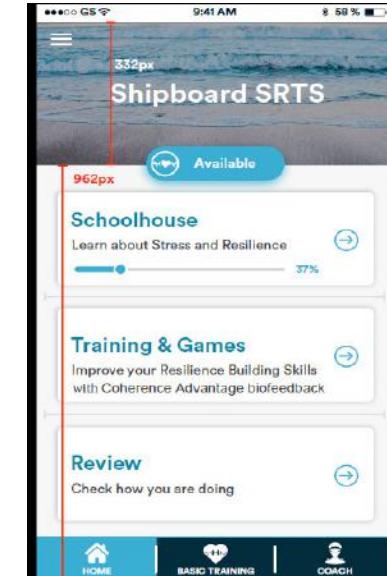
- German SIMNET (Perceptronics)
- Taiwan SIMNET (Perceptronics)
- US Army CCTT (Someone else)
- Computer Games (Everybody)



My Recent Projects Include...

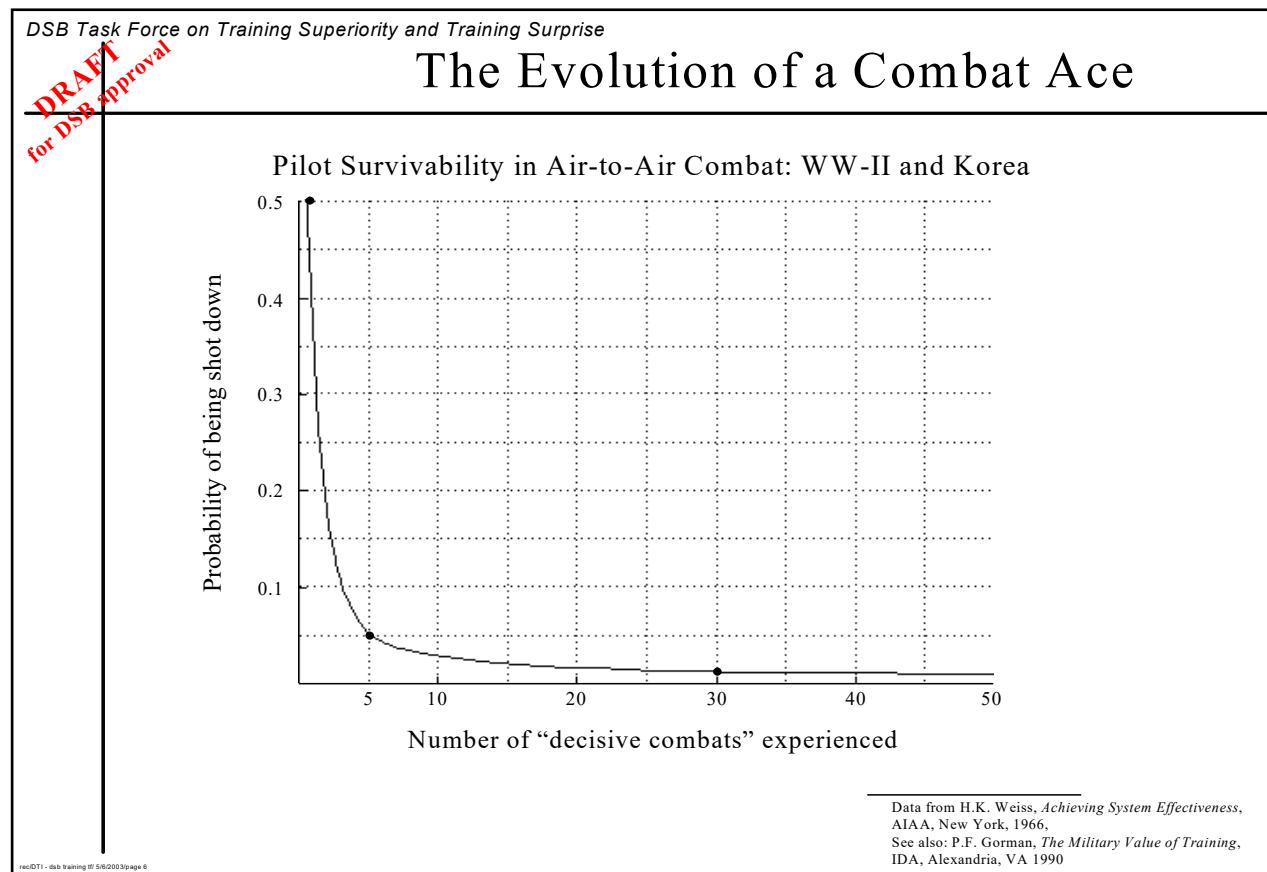
- Stress Resilience Training System (SRTS)
 - Balance negative and positive effects
 - Use proven biofeedback methods
 - Include simulation games for practice
 - Deliver on iPhone & Android devices
 - Apply to military, law enforcement, industry and mental health sectors

- Ethical Trust of Lethal Autonomous Weapons
 - “Killer Robots” are new military weapons.
 - Expected to adhere to ethical standards, but
 - AI-based decisions are hard to predict, so
 - Operators need to be properly calibrated, and
 - Simulation provides a useful technique



Why Is Simulation Important?

Simulation is “Condensed Experience”



....which can be applied to numerous skill areas – even ethics!

Course Schedule

| Lecture Number | Date | Lecture Topic | G. Weltman: 'Engineering, Ethics & Society' | Additional Reading |
|--|--------|---|---|--------------------|
| Module 1 Foundations | | | | |
| 1 | Sep 26 | Introduction and Overview | <i>Engineering, Ethics & Society</i> | G. Orwell |
| Module 1 Foundations | | | | |
| 1 | Sep 26 | Introduction and Overview | Forward & Chapters <i>Engineering, Ethics & Society</i> G. Orwell | G. Orwell |
| 2 | Sep 28 | Bases of Morals & Ethics | | |
| 3 | Oct 3 | Ethical Philosophies | | |
| Module 2 Contemporary Issues | | | | |
| 8 | Oct 24 | Population and Resource Ethics | Chapters 8-15 | |
| 9 | Oct 26 | Environmental Ethics | | |
| 10 | Oct 31 | Bioengineering Ethics | | |
| 11 | Nov 2 | Computing Ethics I: Simulation & Gaming | | |
| 12 | Nov 7 | Computing Ethics II: AI & Robotics | | |
| 13 | Nov 9 | Computing Ethics III: Connectivity | | |
| 14 | Nov 14 | Computing Ethics IV: Surveillance | | |
| Module 3 Ethical Engineering Practice | | | | |
| 16 | Nov 21 | Ethical Decision Making | Chapters 16 & 17 | |
| | Nov 23 | Pre-Thanksgiving Holiday | | |

Fall 2022 schedule is available at course website in Week 1

<https://bruinlearn.ucla.edu/courses/141084>

Course Syllabus

Attendance and Reading

- 17 Lectures
- 10 Discussion Sections
- 17 Textbook Chapters
- Supplemental Readings

Assignments

- 2 Problem Essays
- 2 Examinations
- 5 Textbook Quizzes
- 1 Presentation



Online Textbook
“ENGINEERING, ETHICS & SOCIETY”

Gershon Weltman, Ph.D.
Great River Learning

Access card purchase:
www.grlcontent.com
& UCLA Bookstore

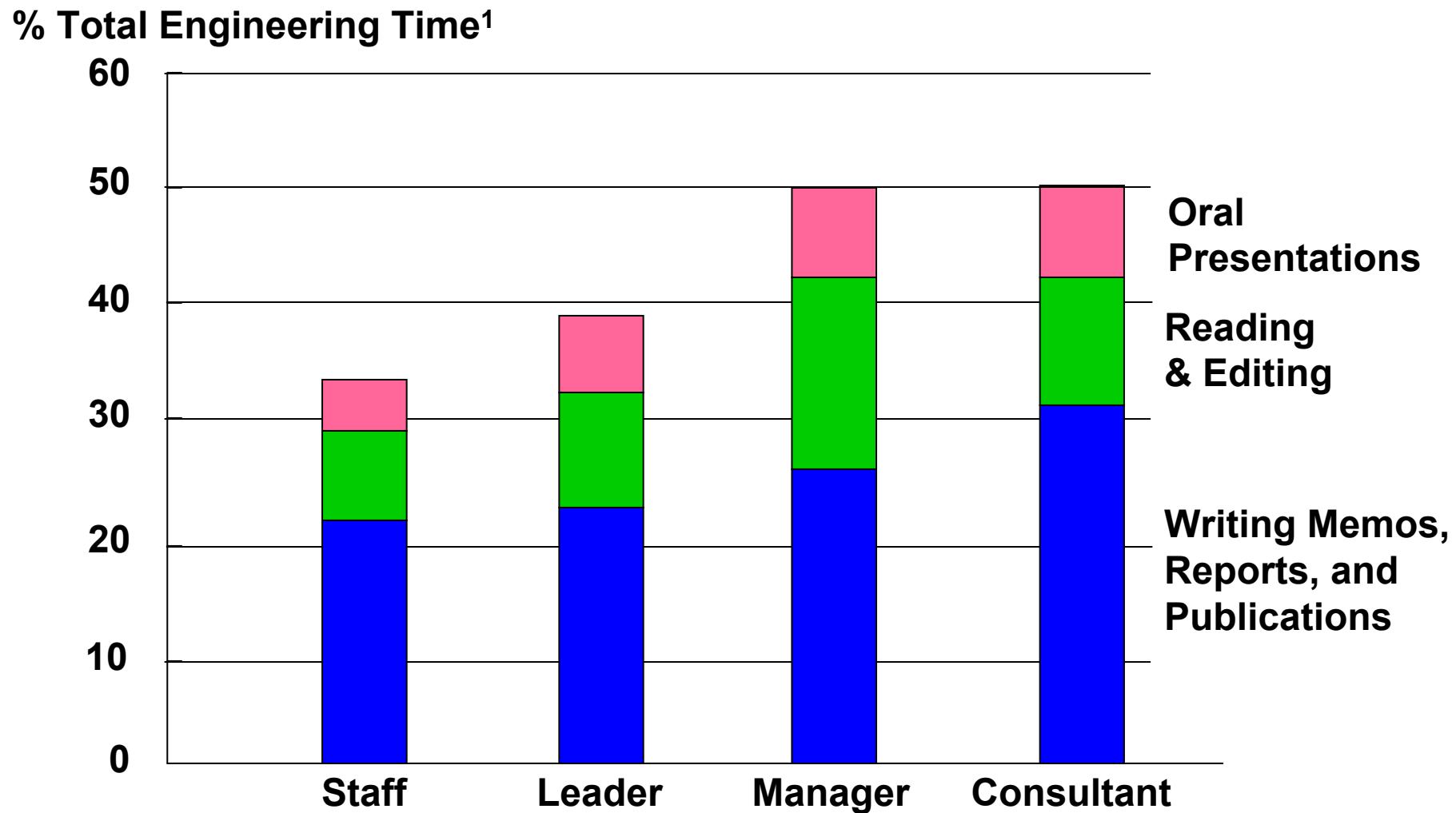
Suggestion: Take notes on what is *emphasized* in the lectures.
Recording and condensed slides are posted on BruinLearn *after* the lecture.

Grading Percentages

| | |
|-----------------------------|------|
| ■ Individual Writing | 42% |
| □ Essay 1 | 21% |
| □ Essay 2 | 21% |
| ■ Examinations | 43% |
| □ Midterm | 15% |
| □ Final | 23% |
| □ Textbook Quizzes | 5% |
| ■ Presentation | 5% |
| ■ Participation | 10% |
| □ Discussion | 9% |
| □ <i>Student Evaluation</i> | 1% |
| | |
| Total | 100% |

All assignments must be completed and submitted to complete the class!

Why We Emphasize Good Writing 1



¹After Bower, D., Technical Communications in R&D Groups, MIT Thesis, 1985

Why We Emphasize Good Writing 2



George Orwell, ~1943

"In 'Politics and the English Language' Orwell castigated contemporaries for using language to mystify rather than to inform. His critique was directed against bad faith: people wrote poorly because they were trying to say something unclear or else deliberately prevaricating. Our problem, it seems to me, is different. Shoddy prose today bespeaks intellectual insecurity: we speak and write badly because we don't feel confident in what we think and are reluctant to assert it unambiguously. Rather than suffering from 'newspeak' we risk the rise of 'nospeak.'

Tony Judt
The New York Review, July 15, 2010

Writing and Engineering Employment

A person asks the New York Times Ethicist Columnist:

"I prescreen job applicants for a small engineering consulting firm committed to equal opportunity. These jobs are primarily technical, but English-language skills are required for the technical writing involved, and a writing sample is requested. Many applications are full of errors in grammar, spelling and punctuation, and are summarily rejected. This disproportionately affects applicants whose names suggest that English may be their second language, as well as other minority groups. Is it ethical to reject engineering applicants for their writing skills? J.W., PENNSYLVANIA"

The Ethicist replies:

"Because clear and accurate writing is a significant part of the job, it is legitimate to eliminate applicants who demonstrate an inability to provide it."

Randy Cohen
New York Times Magazine, May 3, 2010

Our Writing Criteria

- Effective Organization:
 - Contents of Paper and/or Report
 - Full Engagement and Teamwork
- Clear Identification of the Problem
- Adequate Research & Strong Citations
- Comprehensive Description of Issues
 - Problem Background
 - Technical Aspects
 - Ethical and Societal Aspects
- Meaningful Solutions and/or Recommendations
- Original Ideas (?)
- Confidence-Building Presentation

Why We Emphasize Teamwork & Diversity

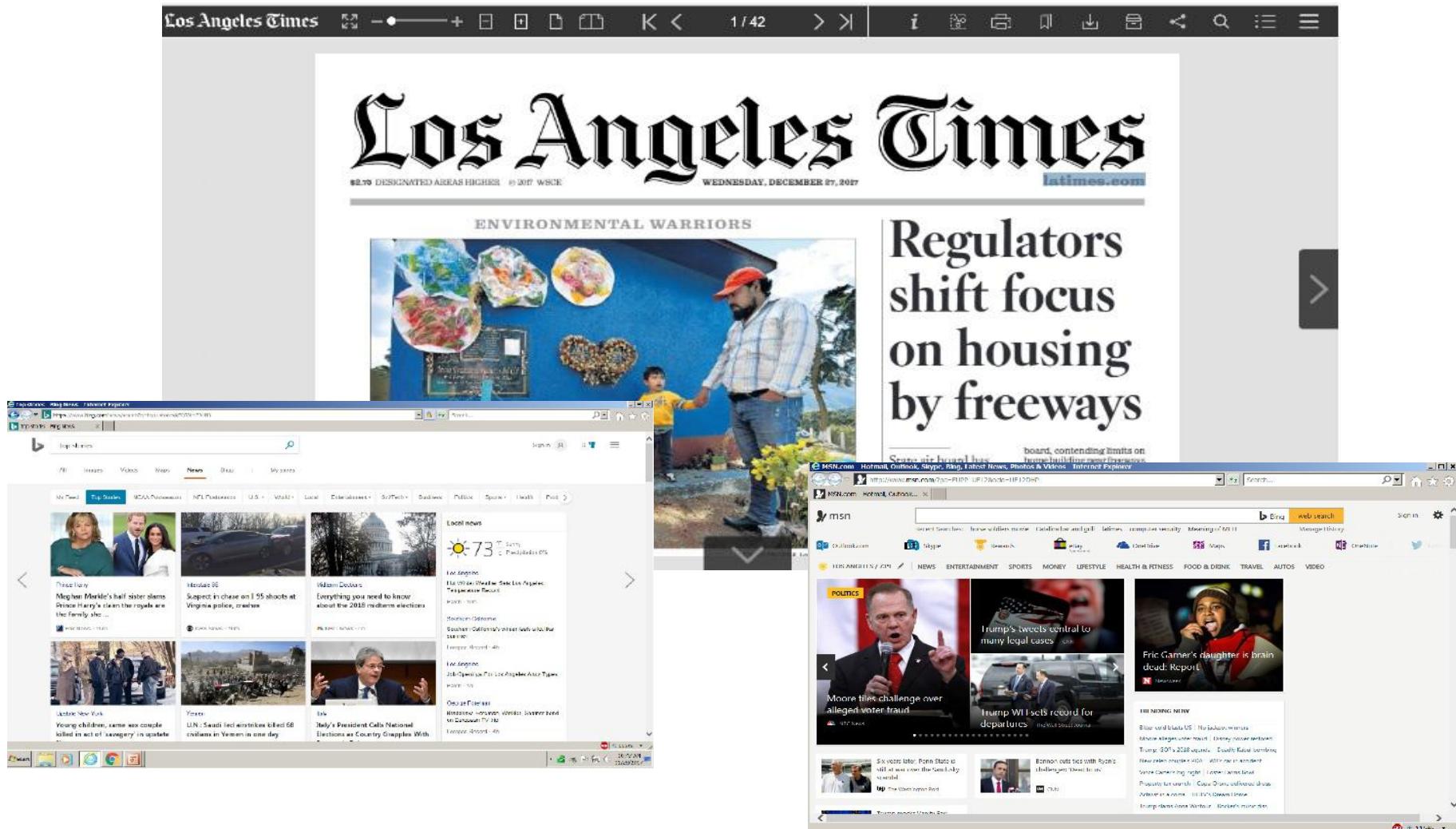
- Successful engineering projects depend on *good teams*
- Modern teams are *highly diverse* in terms of:
 - Disciplines -- Technical and non-technical personnel
 - Organizations – Frequently many and widely distributed
 - Cultures and Ethnicities -- Domestic and international
 - Sex – Gender, identity, pronouns, partner & marriage arrangements, etc.
 - Politics -- Background, party, individual position on issues, etc.

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 - Organizations – Frequently many and widely distributed
 - Cultures and Ethnicities -- Domestic and international
 - Gender, sexual identity, marriage arrangement, etc.
 - Political background, party, position on issues, etc.
- Engineering education *is currently light on teamwork, but*
- Effective *team membership and leadership* can affect
 - Progress in an organization
 - Overall career success
 - Personal contribution and satisfaction
- Engr 183EW provides *knowledge about teamwork and diversity*

Knowing about teams and leadership is so important we give it a whole lecture.

I Also Feature Current News...



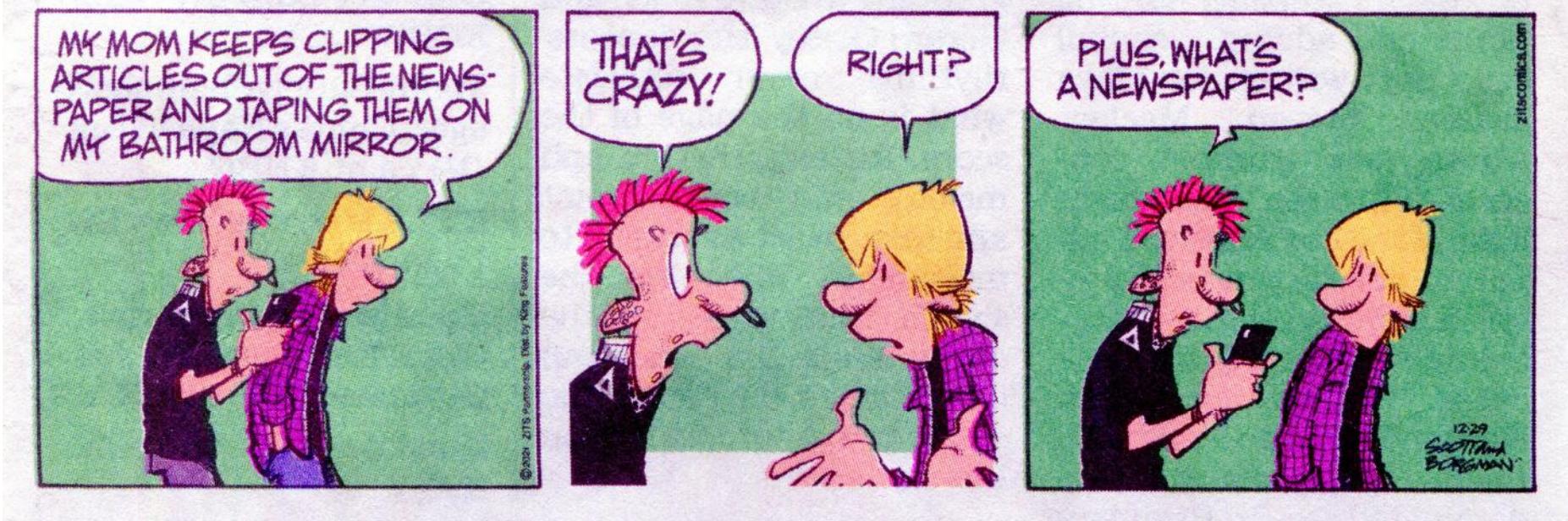
...Because

- Might as well know what a *real newspaper* looks like
- Current news events provide *relevant engineering case studies*
- Many engineering news events have *rich ethical context*
- *Societal and political contexts* fulfill Dean Murthy's criteria

Keeping up with what's happening today helps orient you for your future.

To Make My Point

ZITS By Jerry Scott & Jim Borgman

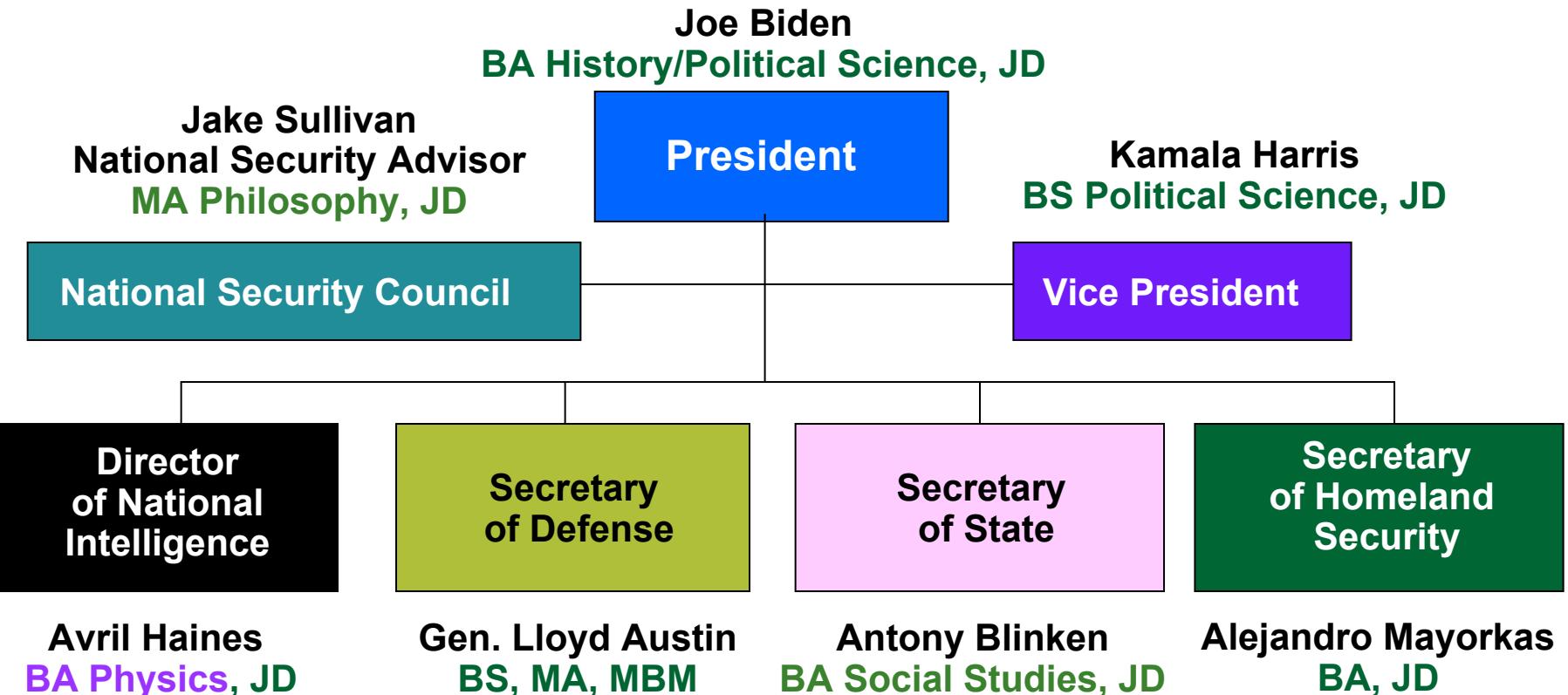


Los Angeles Times, December 29, 2021

Society and the Two Cultures 1

- C.P. Snow's 1959 Lecture/Essay on "Two Cultures:"
 - Humanistic: Literature, history, philosophy, religion, arts
 - Scientific: Science and technology
- Snow's Identified Problem:
 - Society's leaders come from the humanistic culture
 - Society's critical issues are increasingly technological and scientific
- Snow's Suggested Solution: Cross education and interaction
- Today's Identified Problems:
 - The same: Our political leaders are mainly not technical

Society and the Two Cultures 2



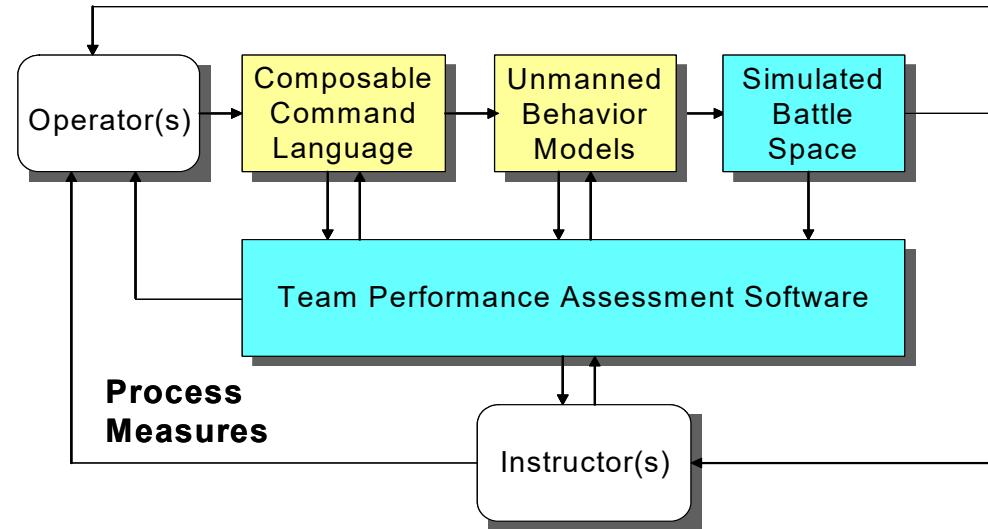
Society and the Two Cultures III

- C.P. Snow's 1950s Two Culture Formulation:
 - Humanistic: Literature, history, philosophy, religion, arts)
 - Scientific: Science and technology
- Snow's Problem:
 - Society's leaders come from the humanistic culture
 - Society's critical issues are technological and scientific
- Snow's Solution: Cross education and interaction
- Today's Problems:
 - The same: Leaders are not technical
 - **And the opposite: Technology leads, society reacts**
- Today's Solution: Greater awareness *and responsibility*

What do we want? How do we get there? The benefits? The costs?

The Engineering Sub-Culture

- We use special languages:
 - ❑ Mathematics
 - ❑ Graphs and Spreadsheets
 - ❑ Schematic Diagrams
 - ❑ PPT & Reports
- We see ourselves as:
 - ❑ Creative
 - ❑ Wide Ranging
 - ❑ Solution Oriented
 - ❑ Rational
- Others may see us as:
 - ❑ Overly Analytical
 - ❑ Unbounded
 - ❑ Problems over People
 - ❑ Dangerous



For Example.....

“When you see something technically sweet
you go ahead and do it,
and you argue about what to do about it
only after you have had your technical success”



Dr. Robert Oppenheimer
Director of the Manhattan Project
to build the first atomic bomb

Trinity Atomic Bomb Test
Alamogordo, NM July, 1945

Ethics: Two Definitions

Ethics is a set of ideas and rules by which to live.

not only

Ethics is fundamentally a set of acts based on ideas and rules by which to live!

“Ethics is the systematic reflection on what is moral.”

Van de Poel and Royakkers, 2011

Existential Ethics and Engineering

- In the World of Existential Philosophy:
 - *Acts* are more important than words
 - *Acts* ultimately define an individual's ethical structure
 - The individual is forced to act
 - *But the individual is free to chose his or her actions!*
- In the World of Engineering
 - Decisions are Actions
- Engineering Decisions are:
 - Continual
 - Both analytical and uncertain
 - Usually time-constrained
 - Multi-person and multi-organizational
 - Based on both technical and ethical factors
 - *Consequential!*

Ethics in Engineering Decision Making

- The “Controlling Factor”
 - E.g. “Ethics trumps economics”
 - “We don’t do that!” or “We must do this”
- Another Decision Component
- The Product of an Ethical Culture
 - Team and Project Dynamics
 - Organizational Standards
 - National & International Codes
- A Personal Issue
 - What do YOU stand for?
 - What do you DO about it?
 - **Having Ethics vs. BEING ETHICAL**
 - **Minimizing the difference between your personal ideals and your actions**



The lesson of the Wizard of Oz

The Engineering Profession

- Meaning of Profession
 - Narrow Definition is Occupation
 - Broader Definition is Authorization or License
 - “*With Authority comes Responsibility*” (*L.M.K. Boelter*)
- Engineering Environment
 - Jobs: Employees to entrepreneurs
 - Organizations: Small to giant, local to distributed
 - Responsibilities: Frequently immense and highly public
 - Influence: Growing rapidly and recognized accordingly
- Professional Ethics
 - Engineering Ethical Codes: Outside influences
 - Personal Ethical Framework: Inside influences
 - Both are important and useful!

Personal Ethics Counts Positively....



With the TRW deal, Northrop Grumman Chairman Kent Kresa will have realized his vision for the company.

By PETER PAE
Times Staff Writer

On Wednesday, if all goes as planned, shareholders will approve Northrop Grumman Corp.'s \$7-billion purchase of TRW Inc., which will culminate a decade of dazzling deal making for Northrop's longtime chairman, Kent Kresa.

Shortly after what many consider to be his greatest acquisition, the 64-year-old Kresa is expected to announce his retirement and turn over the helm to Ronald D. Sugar, 54, who will be left with a defense behemoth with interests in virtually every aspect of the nation's military.

In a remarkable transformation — much of it engineered by Kresa — Northrop will become the nation's second-largest defense firm, with \$26 billion in annual revenue, rivaling No. 1 Lockheed Martin Corp. and ahead of No. 3 Boeing Co. It will have 120,000 employees scattered from coast to coast in 44 states and 25 countries.

With TRW — Kresa's 16th acquisition in eight years — Century City-based Northrop will become one of Southern California's largest companies, employing 24,000 people in El Segundo, Redondo Beach, San Diego and Palmdale and helping revive the region's once-dominant role as home to the nation's leading aerospace firms.

"What Kresa did with Northrop is a truly amazing story," said Jack Kyser, chief economist for the Los Angeles County Economic Development Corp. "Kresa quietly crafted together one of the most successful aerospace firms, and he did it ethically."

The company's ascension

“What Kresa did with Northrop is a truly amazing story,” said Jack Kyser, chief economist for the Los Angeles County Economic Development Corp. “Kresa quietly crafted together one of the most successful aerospace firms, and he did it ethically.”

....and Negatively – Yesterday

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Economic slump: Ethics loom large

Compared with previous recessions, the last two downturns can be pinned more on greed.

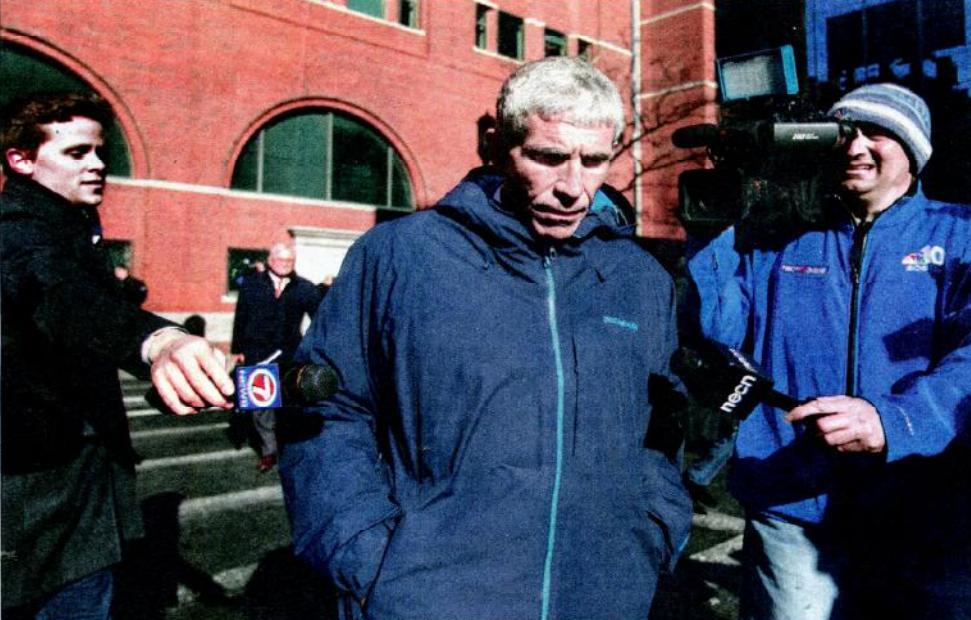
By David R. Francis, September 15, 2008 Christian Science Monitor

It used to be that post-World War II recessions in the United States were the bad part of plain vanilla business cycles – inventories had piled up too high as a result of too few sales, or the Federal Reserve raised interest rates and slowed the supply of new money into the economy to battle inflation. But the mild 2001 recession and the current slump are a bit different. Their cause, at least partly, has been dishonesty, greed, and weak business ethics.

The accounting scandals at Enron, Global Crossing, WorldCom, etc., combined with the bursting of the dotcom stock bubble, pushed the economy down in 2001. Today's sinking economy, to some degree, is the result of sagging real estate values and the bad behavior of many in the mortgage industry and on Wall Street. Losses from today's financial crisis have already reached \$500 billion

....and Negatively – Today

HER © 2019 WST THURSDAY, MARCH 14, 2019



SCOTT EISEN Getty Images

WILLIAM "RICK" SINGER of Newport Beach pleaded guilty this week to charges of fraud, racketeering, money laundering and obstruction of justice in a scheme that shuttled rich students into elite universities.

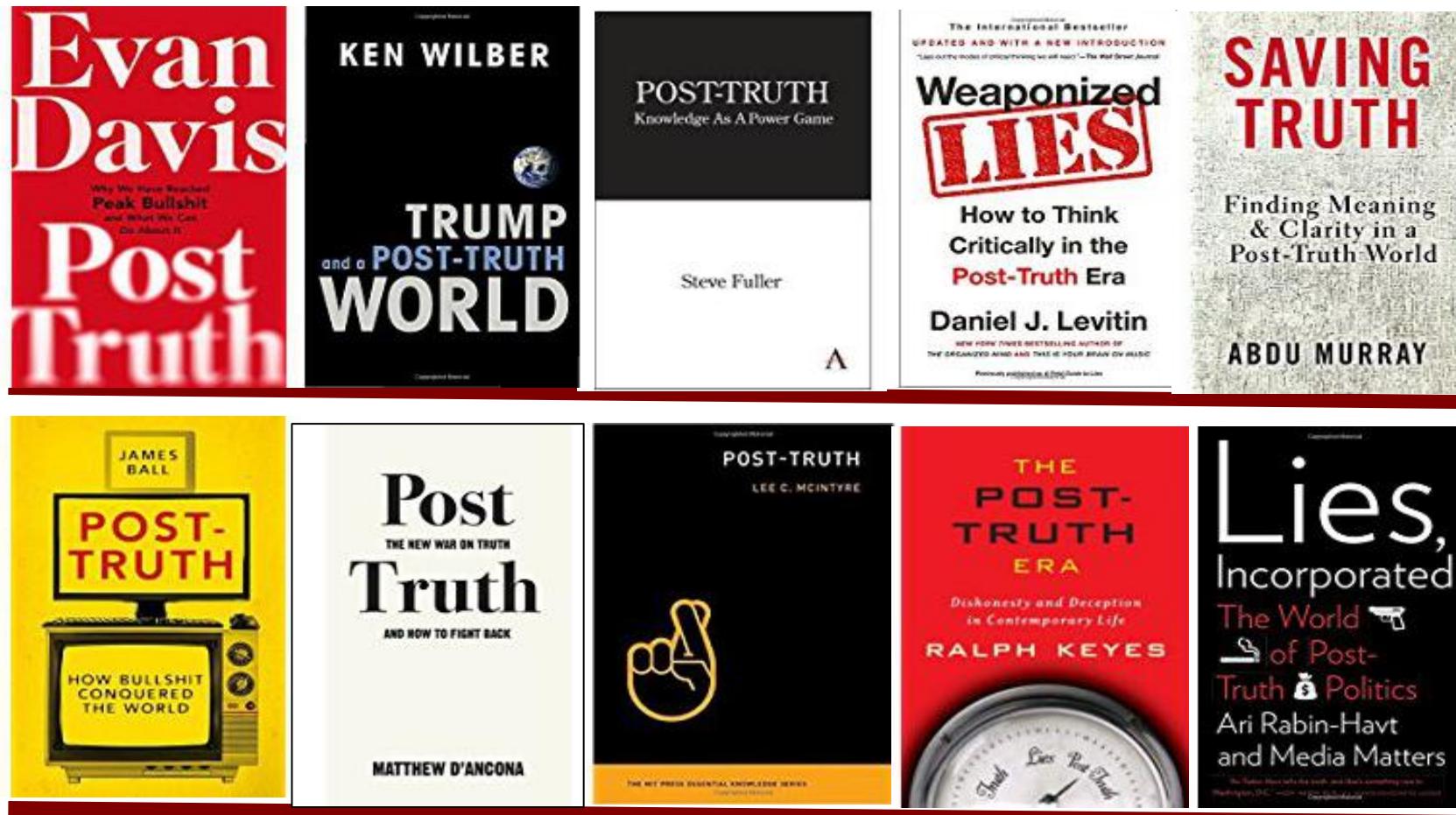
How wealth pried open a ‘side door’ to top colleges

USC’s central role in yet another scandal prompts shock, anger

Two ways to bribe
The cases of fraud vary in detail, but they all took two paths to deceive college admissions boards:

It was the ‘home run of home runs,’ he said: a con that raked in

In Addition: The War on Truth



Just a few of the many books documenting our loss of respect for facts.

In Addition: The War on Truth...

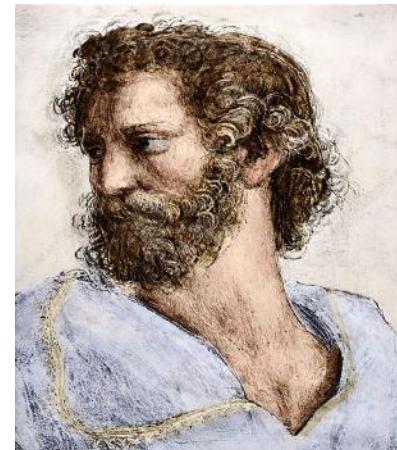


Just a few of the many books documenting our loss of respect for facts.

...Facts vs. Feelings...

Regarding what is true:

“To say of what is that it is not, or of what is not that it is, is false; while to say of what is that it is, and of what is not that it is not, is true.”



Aristotle
Greek Philosopher

Regarding the false perception that US crime has increased steadily:

“liberals have a whole set of statistics that theoretically may be right...as a political candidate, I’ll go with how people feel and let you go with the theoreticians.”



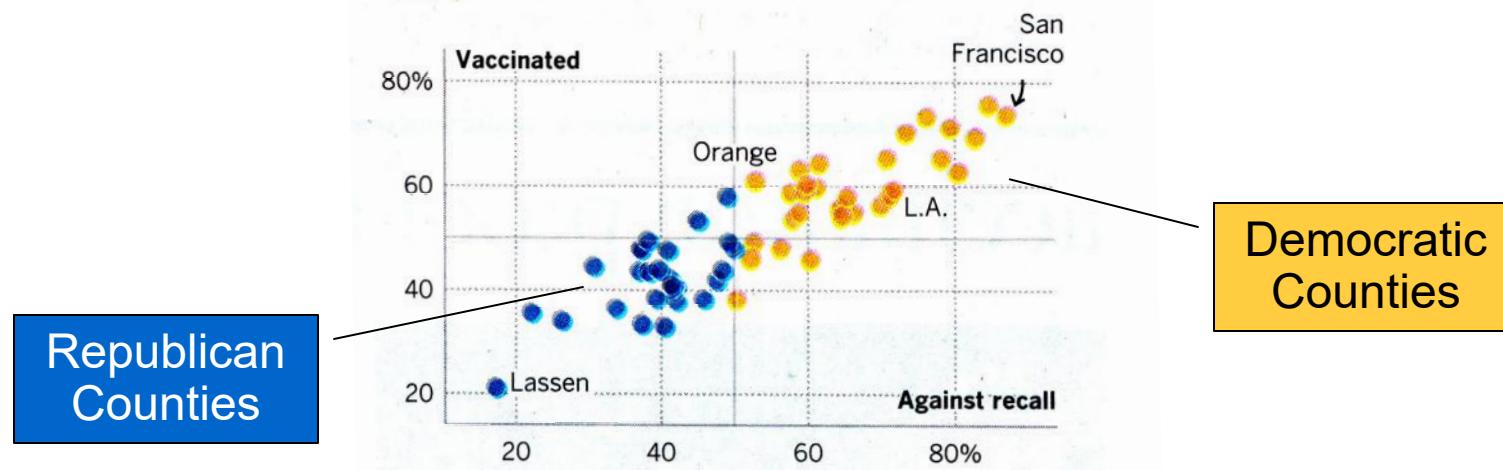
Newt Gingrich
Republican Politician

After Lee McIntyre, “Post Truth,” MIT Press, Cambridge MA, 2018

...and a Country Politically Divided

Divide on recall, vaccination

Results of the recall election show that counties with higher COVID-19 vaccination rates were more likely to support Gov. Newsom. Yellow dots indicate counties that voted against the recall, blue dots those that voted for it.



Los Angeles Times, September 16, 2021

Attitudes toward scientific/technical issues typically interact with political beliefs.

Step-Wise Optimization: Perfecting the World Through Sequentially Good Ethical Decisions



The difficulty is that everybody has to agree on our mountaintop destination.

The Challenge (and Opportunity) Ahead*

| | | <u>2004</u> | <u>2008</u> | <u>2010</u> | <u>2012</u> |
|---|-----|-------------|-------------|-------------|-------------|
| ■ Have you ever | | | | | |
| □ Cheated on exam..... | 62% | 64% | 59% | 51% | |
| □ Stolen from store | 27% | 30% | 29% | 20% | |
| □ Lied to teacher | 62% | 64% | 66% | 55% | |
| □ Lied to parent | 82% | 82% | 80% | 76% | |
| ■ Need to lie and cheat sometimes to succeed..... | 51% | -- | 39% | 36% | |
| ■ Successful people do anything to win even if others call it cheating | | 59% | 58% | 57% | |
| ■ Better at doing right thing than most other people | 74% | -- | 79% | 81% | |
| ■ Satisfied with own ethics | 92% | 92% | 92% | 93% | |
| ■ Important to be a person of good character | 98% | 98% | | | |

*Based on surveys of large numbers of high school students performed by Josephson Institute of Ethics
(www.josephsoninstitute.org)

“Framing” Engineering Decisions Can Help

When the same problem is framed as a…



…participating groups react quite differently.

Our goal: Learning to frame professional decisions as both Business (i.e., Engineering) and Ethical – as the situation demands

Chana Joffe-Walt & Alix Spiegel, *Psychology of Fraud*, NPR, May 1, 2012

In Summary

- **Engineering** is about what *can be done* in terms of technology,
- **Ethics** is about what *should be done* for the benefit of society (and individuals),
- **Engineering Ethics** is about *taking the right technological actions* as individual engineers and as engineering companies and organizations

Practice Online Poll

- Log in to UCLA_WIFI or EDUROAM
- Go to <https://onlinepoll.ucla.edu>
- Search for Engr 183EW–Ethics1
- Password: 1234
- Answer the 3 multiple choice questions
- Hit “SUBMIT”
- Finish in 3-5 minutes