

SUnMaRC PANEL DISCUSSION: FINDING A JOB IN INDUSTRY

Carolyn Lanser

My Meme

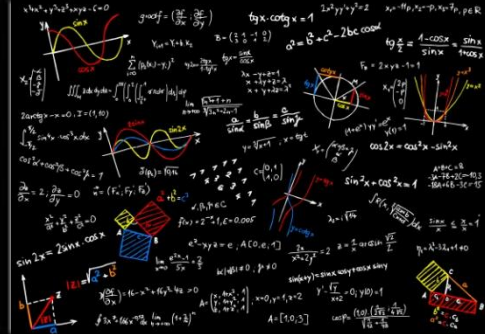
Mathematician in Industry



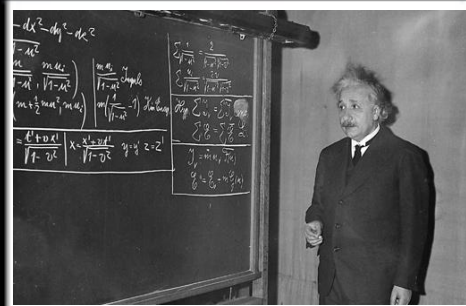
What my Dad thinks I do



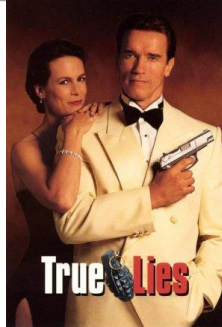
What my Grandma thinks I do



What my Mom thinks I do



What society thinks I do



What my friends thinks I do



What I thought I'd do while in college

What I actually do

- ▣ Work with multiple disciplines
- ▣ Present ideas and results
- ▣ Learn/evaluate new technologies/concepts
- ▣ Create, modify and implement algorithms
- ▣ Analyze systems and data
- ▣ Design
- ▣ Debug
- ▣ Work in groups

Why does Math matter?

- ▣ Mathematics trains your mind:
 - Correlating/analyzing data
 - Abstract thinking
 - Questioning assumptions
 - Creative thinking
 - Proofs: systematic and rigorous
 - Logical thinking
 - Patience
 - Discipline
 - Step-by-step problem-solving skills (scientific way)

Math in Industry

- Current market surveys highly rate careers, considering factors such as:
 - income
 - future outlook
 - physical demands
 - job security
 - stress
 - work environment
- The *Jobs Rated Almanac*, a 2011 publication of World Almanac Books of New York, NY, rated these careers in the Top 10:
 - Actuary
 - Computer Systems Analyst
 - Software engineer
 - Computer programmer
 - Accountant
 - Industrial engineer
- *Career Cast* rated Software Engineer, Mathematician, Actuary, Statistician, Computer Systems Analyst, Physicist and Financial Planner in the Top 15 in 2011

Math in Industry

How does this apply to you?

- Understand the differences between academia and industry
- Explore your interests, weigh the odds and benefits:
 - Operations research analyst
 - Statistician
 - Physician
 - Research scientist
 - Computer scientist
 - Inventory strategist
 - Staff systems air traffic control analyst
 - Cryptologist
 - Attorney
 - Economist
 - Mathematics professor/teacher
 - Geodesist
 - Environmental mathematician
 - Robotics engineer
 - Geophysical mathematician
 - Design
 - Ecologist
 - Photogrammetrist
 - Civil engineer
 - Geomatics engineer
 - Actuary
 - Financial Analyst
 - Personal Financial Advisor

How to prepare for the future

- Expose yourself to various environments
 - Company size
 - Gov't vs. commercial vs. academia
- Expose yourself to other disciplines and/or consider an advanced degree
- Research, work experience
 - Independence
 - Transfer of knowledge
 - Hone your “professional skills”
 - Written and oral communication
 - Exposure to non-technical audience
 - Appearance
- Don't be shy about “failure”
- Brag honestly about your skills

End of Presentation

Notes on math-related professions (1/3)

- **actuary**-- assemble and analyze statistics to calculate probabilities of death, sickness, injury, disability, unemployment, retirement, and property loss; design insurance and pension plans and ensure that they are maintained on a sound financial basis
- **mathematics teacher**-- introduce students to the power and beauty of mathematics in elementary, junior high, or high school mathematics courses
- **operations research analyst**-- assist organizations (manufacturers, airlines, military) in developing the most efficient, cost-effective solutions to organizational operations and problems; this includes strategy, forecasting, resource allocation, facilities layout, inventory control, personnel schedules, and distribution systems
- **statistician**-- collect, analyze, and present numerical data resulting from surveys and experiments
- **physician**-- diagnose patient illnesses, prescribe medication, teach classes, mentor interns, and do clinical research; students with a good mathematics background will find themselves being admitted to the best medical schools and discover that mathematics has prepared them well for the discipline, analysis, and problem-solving required in the field of medicine
- **research scientist**-- model atmospheric conditions to gain insight into the effect of changing emissions from cars, trucks, power plants, and factories; apply these models in the development of alternative fuels
- **computer scientist**-- interface the technology of computers with the underlying mathematical principles of such diverse applications as medical diagnoses, graphics animation, interior design, cryptography, and parallel computers

Notes on math-related professions (2/3)

- **inventory strategist**-- analyze historical sales data, model forecast uncertainty to design contingency plans, and analyze catalog displays to make them more successful; analyze consumer responses
- **staff systems air traffic control analyst**-- apply probability, statistics, and logistics to air traffic control operations; use simulated aircraft flight to monitor air traffic control computer systems
- **cryptologist**-- design and analyze schemes used to transmit secret information
- **attorney**-- research, comprehend, and apply local, state, and federal laws; a good background in mathematics will help a student get admitted to law school and assist in the understanding of complicated theoretical legal concepts
- **economist**-- interpret and analyze the interrelationships among factors which drive the economics of a particular organization, industry, or country
- **mathematics professor**-- teach mathematics classes, do theoretical research, and advise undergraduate and graduate students at colleges and universities
- **environmental mathematician**-- work as member of interdisciplinary team of scientists and professionals studying problems at specific Superfund sites; communicate effectively across many academic disciplines and be able to summarize work in writing
- **robotics engineer**-- combine mathematics, engineering, and computer science in the study and design of robots
- **geophysical mathematician** -- develop the mathematical basis for seismic imaging tools used in the exploration and production of oil and gas reservoirs
- **design** -- use computer graphics and mathematical modeling in the design and construction of physical prototypes; integrate geometric design with cost-effective manufacturing of resulting products
- **ecologist** -- study the interrelationships of organisms and their environments and the underlying mathematical dynamics
- **geodesist** -- study applied science involving the precise measurement of the size and shape of the earth and its gravity field (courtesy of Bruce Hedquist)

Notes on math-related professions (3/3)

- **civil engineer** -- plan, design, and manage the construction of land vehicle, aircraft, water, and energy transport systems; analyze and control systems for land vehicular traffic; analyze and control environmental systems for sewage and water treatment; develop sites for industrial, commercial and residential home use; analyze and control systems for storm water drainage and storage; manage construction of foundations, structures and buildings; analyze construction materials ; and surface soils and subterranean material analysis (courtesy of Bruce Hedquist)
- **geomatics engineer** -- once known as "surveying engineer", includes geodetic surveying : takes into account the size and shape of the earth, in order to determine the precise horizontal and vertical positions of geodetic reference monuments; cadastral surveying : establishes and reestablishes the reference monuments for the U.S. Public Land Survey System, i.e., township and section corners; topographic surveying : determines the detailed configuration or contour of the natural earth's surface and the position of fixed objects thereon or related thereto; hydrographic surveying : similarly determines underwater contours and features; land surveying : is the location of existing parcel and new land subdivision lines, road and utility rights-of-way and easement lines, and determination of the location of existing and new reference monuments, which mark property lines and parcel corners; land surveying : also involves the preparation of legal descriptions for officially recorded land ownership conveyance deeds and other land title documents; construction surveying : is the determination of the direction and length between and the elevations of reference points for fixed private and public works, as embraced within the definition and practice of civil engineering, and the labeling of reference markers containing critical information for the construction thereof; design, operation and management of advanced Geographic Information Systems (GIS and Land Information Systems (LIS), as well as other sophisticated computer mapping and CAD based geospatial applications (courtesy of Bruce Hedquist)