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## The Future of Actuarial Science

Donald Mango, FCAS, MAAA

*Vice Chairman, Enterprise Analytics*

*Guy Carpenter, New York*

10 December 2013



The future is here

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ertise  
ponsorship  
Thought leadership  
Progress  
Community  
Sessional  
Education  
Working par  
Volunteering  
Research  
Shaping the future  
Networking  
Professional support  
Enterprise and risk  
Learned society  
Opportunity  
International profile  
Journals  
Support



# Get to know your Speaker...

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## Born in California



## Raised in Texas



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## Work in New York City



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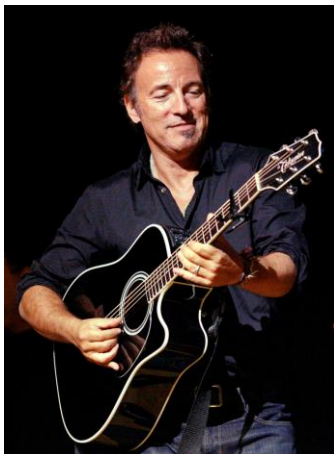
## Live in New Jersey



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## Global Exports from New Jersey



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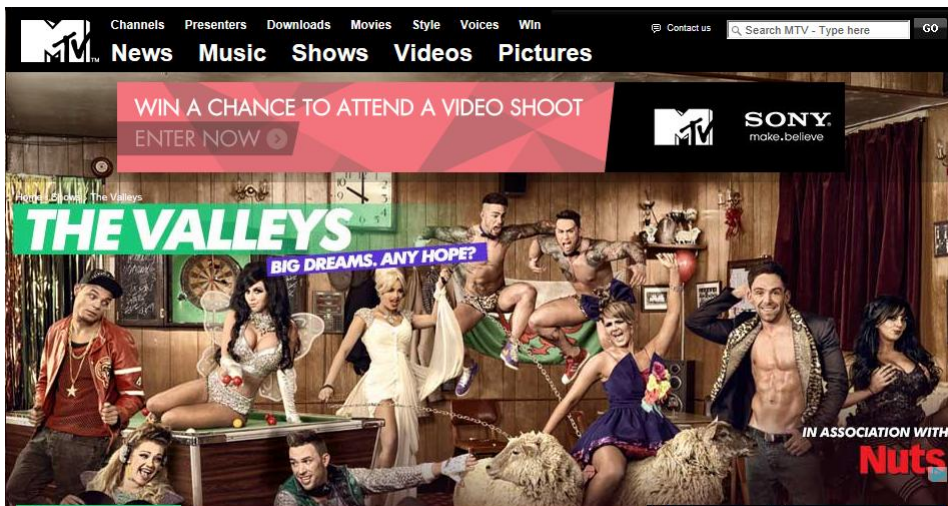


## Global Exports from New Jersey



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## Pull Down Thy Vanity



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## More Fun Facts About Your Presenter

- CAS actuary for 27 years
- Current CAS Board Member
- Studied Engineering @ uni
- Fan of philosophy, poetry and military history
- Known to pander to audiences

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## British Words I Love

- Smart
- Cheeky
- Boot
- Bonnet
- Burberry (the wife loves that one)

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# The Future of Actuarial Science

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# The Future of the Actuarial Profession

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## The Future of the Actuarial Profession

- Current State
- Closer Look at The Franchise
- SWOT Analysis
- Some possible futures
- Bits of humour mixed in

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## The Current State of the Actuarial Profession

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**The best job you never thought of** **CNNMoney**

By Annalyn Kurtz @AnnalynKurtz April 25, 2013: 6:32 AM ET

Tweet 174 Share 137 7 Email Print



Actuary consistently ranks among the top jobs in the United States. Do you know what they do?

NEW YORK (CNNMoney)

One of the best jobs in America often flies under the radar.

It's in high demand, can pay six-figures a year, and your employer often foots the bill for on-the-job training. No grad school required!

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## Great Time to be an Actuary

- Central position at the nexus of massive forces battering all elements of human activity
  - Climate change
  - Longevity
  - Genomics
  - Technology
  - Demographics
- Profession has the Inside Track to provide **expertise, insights, and solutions**
  - © 2013 Casualty Actuarial Society

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## What drives the demand?

### *Core Issues of Existence*

- Longevity
- Disability
- Health
- Home
- Automobile
- Employment
- Uncertainty
- Contingency
- Funding mechanisms
- Social engineering
- Wealth transfer
- Rights, obligations, entitlements
- Social contract

**Demand is strong and getting stronger**

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## 1999 CAS CEO Survey

### *What Can We Do Better*

- Develop general business skills and a broader business perspective
- Learn to operate under uncertainty and learn how to take business risks
- Generate creative ideas or solutions
- Grow – business people must grow and mature beyond their technical training
- Improve modeling techniques: (1) develop models that do not require large bodies of historical data, and (2) incorporate current information and trends into models
- Provide quicker, more responsive solutions
- Improve teamwork skills with non-actuaries

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## Morris report (2005)

- Could cling to our reserved roles
- *Risk competition inroads and ultimately a declining position*
- Or could expand the franchise
- *Like the Australians*

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## The Actuarial Franchise

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## Humour Break

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## How to lose a franchise

The screenshot shows the homepage of the website [www.Mango.org](http://www.Mango.org). The header includes navigation links: Consumers | Mango Industry | Retail | Foodservice | Nutrition Professionals | Media, a search bar, and a 'Search' button. Below the header is a red banner with links: Get to Know Mangos | Recipes | Video Showcase | For Your Family | Events | Blog, and a link to 'En Español'. The main content area features a large image of hands cutting a mango with a spoon. To the right of the image, the text reads 'How To CuT a Mango' (with 'CuT' in blue) and 'Cutting a mango doesn't have to be a mystery.' Below this is a yellow button that says 'We'll Teach You How'.

## How to lose a franchise


 
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[COMPANY](#)

**Mango Solutions** is a data analysis company headquartered in the UK. With offices throughout the world we deliver tailored training, consulting and software.

We assist our customers in harnessing the power of complex statistical analysis to support business critical decisions.



**Mango Pharma**  
Pharmaceutical and  
Biotech companies

**Mango Imaging**  
Image Analysis

**Mango Energy**  
Energy sector

**Mango Finance**  
Finance sector

**Mango CRM**  
CRM sector

**Mango Sensory**  
Food sector

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## How to lose a franchise

# MANGO

[G](#) [BAGS](#) [SHOES](#) [ACCESSORIES](#) [MAGAZINE](#) [CATALOGUE](#) [SOCIAL](#) [TV](#) [SPECIAL PRICES](#)
[TOTES, HOBOS](#)
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INTRODUCING

## MANGO PREMIUM

FINE QUALITY



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## Is there an Actuarial Franchise?

- Actuaries apply fairly standard statistical methods to really bad data
- Exclusive knowledge?
- Patent protected?
- Brand enforced?
- Guild enforcers?

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## The Actuarial “Franchise”




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## The Actuarial “Franchise”

- Licensed, Professional, Financial Contingency Analysts
- The Franchise is the Profession

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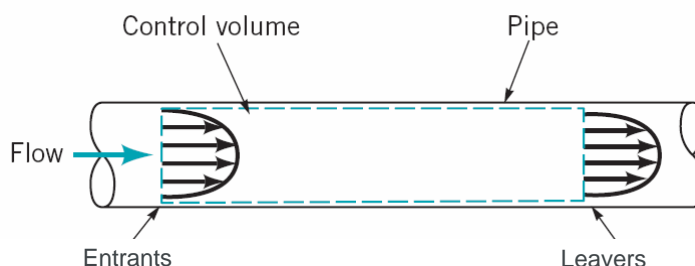
## The Profession

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## What is the Profession?

### *A Control Volume (from fluid mechanics)*



- A boundary into and out of which material flows
- Container that persists over time
- Field phenomenon: the CV is not the material within it, nor is the material the CV

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## What is the Profession?

### *A Control Volume*

- A Shared Asset of Reputation
- Inherited from past and current actuaries
- Transferred to future actuaries
- A delicate, wonderful thing
- Evolved over time, nearly impossible to start from scratch
- Don't botch it up!

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## Humour Break

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## Taste of Texas for Ya (*Value-add*)

- Yonder
- Y'all
- All Y'all
- Dance with the girl that brung ya
- Don't git above your raisin'

## Taste of Texas Quiz

- You can have my gun when you...
- ...pry it from my cold, stiff fingers

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## SWOT Analysis of the Profession

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## SWT Analysis of the Profession

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### Strengths

- Position
  - We are the envy of professions around the world
  - Example: radiologists in the US
- Strong, self-sustaining reputation
  - Thanks to the caliber of new talent attracted to the profession (high quality inflow)
- High barriers to entry for competing professionals
  - Would need to convince regulatory bodies of inadequacy of actuarial performance, **and** have an alternative profession ready
- Self-educating facilitates mid-career entry

## Strengths: We are Legion

### *The Lost Tribes of Actuaries*

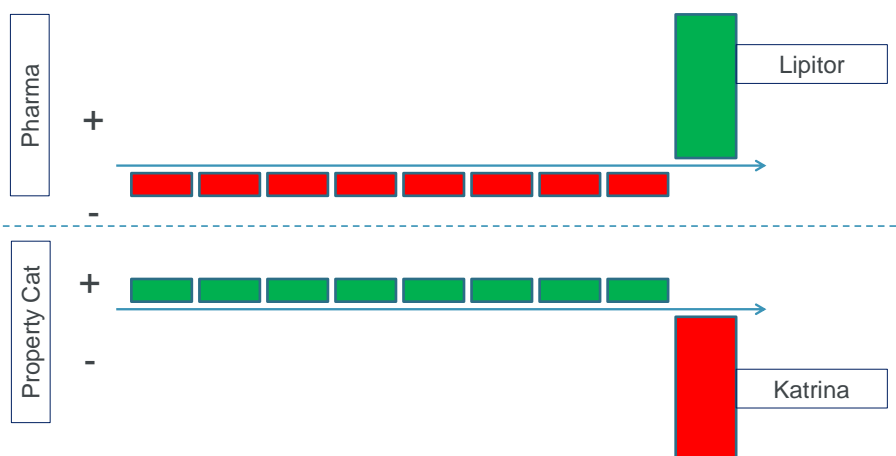
- Reliability engineers
  - They use Weibull curves!
  - Service warranty portfolios are insurance
- Credit analysts
  - The “actuarial method”
- Reservoir engineers (oil and gas reserves)

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## Pharmaceutical Pipeline

### *Negative Property Cat Reinsurance*



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## Weaknesses

- Self-educating means we are slow to adapt
  - ERM, capital modeling, stochastic reserving via self-study and timed examination?
  - We only feel comfortable testing what we know – how to innovate?
- Mathematicians need closed-form solutions and answers
- Long course of study can limit mobility into different functions in companies

## Weaknesses: Our Strength

- Like a football club who have gone undefeated and never trailed in a single game
- Don't know how to play from behind

## Threats from Without

- Statisticians and data scientists
- Financial engineers
- Tradability
- Securitization
- New educational models

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## American Statistical Association

# AMSTATNEWS

The Membership Magazine of the American Statistical Association

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### Aren't We Data Science?

1 JULY 2013 3,056 VIEWS 9 COMMENTS



Davidian

Last month, I shared [this column](#) with President-elect Nat Schenker and Past President Bob Rodriguez to announce an ASA strategic initiative to promote engagement of statisticians in Big Data. I'm following that announcement with an account of some of my recent experiences regarding data science, which inspire my enthusiasm for this effort. One in particular serves as a metaphor for the disconnect between statistics and data science we noted last month.

Around the time we were finalizing that column, Michelle Dunn, chair of the [ASA Committee on Funded Research](#), forwarded an email to me. Michelle thought I would be interested in learning from the press release in the email that Eric Green would be speaking in Chapel Hill, North Carolina, 25 minutes from my office in Raleigh, on April 23. In January, the director of the [National Institutes of Health \(NIH\)](#), Francis Collins, announced the creation of a new NIH-wide position, the

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## ABOUT

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Job of the Week: Data Scientist (The Economic Times)

A short piece written by The Economic Times about the popularity of the data science field and of the profession itself. (Photo courtesy of The Economic Times)

**MORE**

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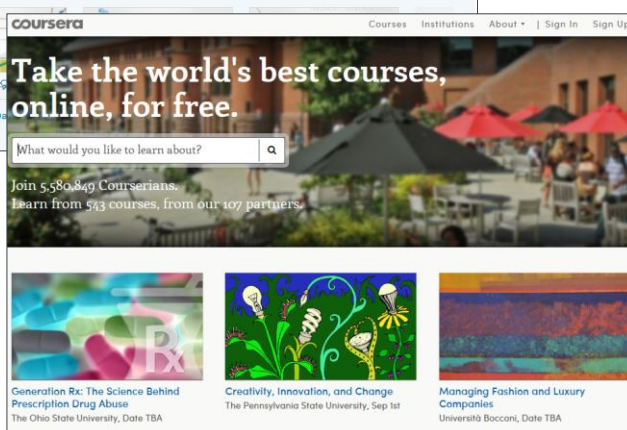
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## Intro to Salesforce App Development



## Introduction to



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## Threats from Within

- Complacency
- “Maintaining the Rigour” of the designation
- Scarcity mindset

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## Opportunities

- Reputation and inside track position
- No guarantees on the specifics, but would rather have the seat at the table
- Look at the state of current and future demand – the amount and degree of unsolved problems facing our public

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## Pension Reinvigoration

*DWP, Nov 2012*

- *Increase the amount people are saving in pensions.*
- *Increase the amount people receive for their savings.*
- *Enable industry innovation and development of new products including those which will give people more certainty about their pensions and encourage more risk-sharing.*
- *Increase transparency and build trust, confidence and engagement in pension saving as the norm.*
- *Ensure the sustainability and stability of the UK pension system.*

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Money > Occupational pensions

## Government outlines 'defined ambition' pension proposals

New pension scheme could split the savings risk between workers and their employers

**Hilary Osborne**

[theguardian.com](http://theguardian.com), Thursday 7 November 2013 11.02 EST

 [Jump to comments \(108\)](#)

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25 Nov 2013

## PENSION INSURANCE CORP BUYS £1.4BN LONGEVITY PROTECTION

UK-based defined benefit pension plan consolidator and solution provider Pension Insurance Corporation (PIC) has bought £1.4bn (\$2.26bn) of longevity protection. PIC chief financial officer Rob Sewell noted...**"for each year that life expectancy exceeds predictions, liabilities increase by about 3%"**.

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## Research Items: Life Practice

- *Asset Liability management*
- *Defined Ambitions*
- Extreme Events
- Policyholder Behavior in Extreme Conditions
- Takaful Life Insurance
- Longevity Catalysts

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## Research Items: Health and Care Practice

- Cancer Modelling
- Critical Illness
- Genetics
- Income Protection
- Long Term Care

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## Research Items: General Insurance Practice

- Advanced Pricing Techniques
- Discrimination or Differentiation?
- Emerging Mobile Technologies
- PPOs

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## Research Items: Finance And Investment Practice

- Social Finance & Impact Investing - measuring non-financial returns
- 'Disintermediation': the likely rise of Peer-to-Peer Investing and Alternative Financing Models
- Why Retire? Alternative models to pensions
- Designing Investment Vehicles to Mitigate Agency Risk
- How and Why to Get Actuaries into the Wider Fields - especially Education

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## Three Possible Futures

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## Future 1: Hold

- No erosion of current (traditional) strongholds
- See Morris

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## Future 2: Annexation

- Vertical and horizontal expansion from existing strongholds
  - See 1999 CEO survey
- May require more time-effective means to accreditation
  - E.g., U.S. Bar Exam for attorneys = three days

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## Future 3: Risk Engineer™

### *Hybridizing with the Lost Tribes*

- Reliability engineers
- Credit analysts
- Pharmaceutical pipeline managers
- Reservoir engineers (oil and gas reserves)

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## Future #3: Risk Engineer™

### *Hybridizing with the Lost Tribes*

- **Untradeable** part of the Financial Engineering Spectrum
  - Or held-to-maturity, low liquidity, incomplete market
- See 2008: when the credit markets seized, people had to “**mark-to-model**” which we do all the time

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## What then must we do?

- Respect and enhance our Reputation with key stakeholder communities
  - The Reputation is our greatest (and most fragile) shared asset
- Get engaged with the Research items in your Practice
  - Future is now
- Think hybridization and a nimble value proposition
  - Bringer of light, not lamplighter

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## The Future of the Profession is YOU

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# Questions

# Comments

Expressions of individual views by members of the Institute and Faculty of Actuaries and its staff are encouraged.

The views expressed in this presentation are those of the presenter.