



Secrets to Learn Before You Graduate

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Roadmap

Life as an Academic

Keys to Success

Secrets of Life Worth Learning



Life as an Academic

What do we do?

***Teaching**

***Research**

***Service**





The Business of EDUCATION

***Teaching**

- Classroom
- Advising (UG & G)

***Research**

- Publication & Scholarship
- Grants (Government) & Contracts (Industry)
- Seminars & Lectures

***Service**

- Department, University, National
- Professional
- Consulting





What do I do?

Areas of Research

Sequential Stochastic Assignment Problems

- * Basic Research
 - Applied probability
 - Optimal decision-making under uncertainty
- * Theory and Algorithms



AIR FORCE OFFICE OF SCIENTIFIC RESEARCH



Aviation Security System Analysis

- * Aviation Baggage Screening Security System Design
 - * False Alarm / False Clear Tradeoffs
 - * Control Theory
 - * Markov Decision Processes
 - * Optimal Asset Allocation
 - * Optimal Decision-Making
 - * Aviation Security National Policy Implications
- 

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University of Illinois News Bureau Press Release



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LATEST NEWS »

Risk-based passenger screening could make air travel safer




Photo by
L. Brian Stauffer

Illinois professor Sheldon H. Jacobson developed algorithms to address risk in airline passenger populations to help determine how best to allocate airport security resources.

Click photo to enlarge

HIGHLIGHTS »

CAMPUS NEWS »

Jon S. Davis appointed head of accountancy

Illinois Dean's List, graduates named for August, December 2011

Ten undergraduates awarded Gilman Scholarships to study abroad

Jeff Christensen named acting U. of I. police chief

Famed director kicks off MillerComm lecture series at Illinois

STORY

1/31/2012 | Liz Ahlberg, Physical Sciences Editor | : eahlberg@illinois.edu

CHAMPAIGN, Ill. — Anyone who has flown on a commercial airline since 2001 is well aware of increasingly strict measures at airport security checkpoints. A study by Illinois researchers demonstrates that intensive screening of all passengers actually makes the system less secure by overtaxing security resources.

University of Illinois [computer science](#) and [mathematics](#) professor [Sheldon H. Jacobson](#), in collaboration with Adrian J. Lee at the Central Illinois Technology and Education Research Institute, explored the benefit of matching passenger risk with security assets. The pair detailed



Vaccine Economics and Pricing

- * Mathematical (Integer) Programming
- * Game Theory
- * Design OR Models for Purchasing, Pricing, & Stockpiling Pediatric Vaccines
- * Federal Pediatric Vaccine Procurement Policy Implications

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CENTERS FOR DISEASE CONTROL & PREVENTION**





Political Redistricting Analysis

- * Mathematical Modeling for Designing Congressional Districts Equitably
- * Novel Graph Theory Concepts to Overcome Stringent Design Criteria
- * Implication on Which Political Party Controls Power in Congress

NATIONAL SCIENCE FOUNDATION





Balance Optimization Subset Selection for Causal Inference Experimental Design

- * Novel Approach to Design Causal Inference Experiments in the Social Sciences and Medicine.
- * Exploit Discrete Optimization Structure within a Statistical Framework
- * Implications on Decision-Making Process within Numerous Industries (Pharm., FDA, EPA, ...)

NATIONAL SCIENCE FOUNDATION





Trends in Mass Murders

- * Controversial Public Issue
- * Novel Approaches to Analyze Data to Weed Out New Insights on this Issue.
- * Implications on Public Health Safety and Legislation



Fuel Consumption, Energy, and Obesity

- * Engineering Economic Analysis
- * Public Health and Transportation Implications
- * Attracts Wide-Spread National Attention





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Can a treadmill help you save at the pump?

Experts see better ways than slimming to beat high gasoline prices

By Roland Jones

Associate editor

MSNBC

Updated: 10:01 a.m. CT Nov 1, 2006



Roland Jones

Associate editor

- [Profile](#)
- [E-mail](#)

A new study that received a lot of publicity last week contends that Americans are wasting billions of dollars every year on gasoline because of the growing size of their waistslines.

Yes, the laws of physics still apply when it comes to driving — the fatter you are, the fatter your fuel bills will be, as it takes more power to propel you and your car down the road. But before you jump onto a treadmill to

CNBC VIDEO



[Launch](#)
c_obese_gas_061027.asf

[A weighty issue?](#)

Oct. 27: Sheldon Jacobson, a researcher at the

<http://www.msnbc.msn.com/id/15447601/>

8/23/2007

NCAA Basketball “March Madness” Bracket Analysis

- * Statistical analysis of seed trends
- * Probabilistic assessment of seed combinations

Bracket  Odds

<http://bracketodds.cs.illinois.edu>



United States Presidential Election Prediction (electionanalytics.cs.illinois.edu)

- Statistical analysis of state polling data
- Probabilistic analysis of electoral college vote distributions
- Analyzed the 2014 midterm Senate races
- Analyzed the 2016 Presidential and Senate races.





Multiply what was just described
by 2000+ faculty ...

and you
have what is the
University of Illinois





Research
is what makes the
University of Illinois
an Outstanding
Institution of Higher Learning!





Research

is what will Allow the Degree
that you will earn from the

University of Illinois

Grow in Value!





Thinking about Graduate School?

Graduate students are the oil that makes the research engine run.

In some fields, you are paid to attend graduate school and get your degree!



What I Tell my Graduate Students

Goal for My Students:

- Do the highest quality research
- Publish the highest quality papers
- Win the most prestigious national awards
- Get the best possible position

My Job: Help them achieve all these goals



Awards Won by My Graduate Students



INFORMS George E. Nicholson Student Paper Competition (Honorable Mention).
INFORMS College on Simulation Women and Minority Award
AFOSR Graduate Student Summer Research Fellowship Award.
VT Paul E. Torgersen Graduate Student Research Excellence Award (Second Place)
AAUW Postdoctoral Research Leave Fellowship (Runner-up)
IIE Pritsker Doctoral Dissertation Award Competition (1st Place, 3rd Place)
IIE Graduate Research (Master's Thesis) Award Competition, (1st Place, 2nd Place)
UI Ph.D. Thesis Initiation Fellowship, Program in Arms Control, Disarmament, & Int .Security
UI M&IE Alumni Teaching Fellow (2)
UI M&IE Harper Safety Award (2)
INFORMS Computing Society Student Paper Competition (Runner-Up)
Federal Aviation Administration / USDOT Graduate Research Award on Public-Sector Aviation Issues
INFORMS Transportation Science & Logistics Dissertation Prize (Honorable Mention)
COE Mavis Graduate Fellowship (2)
National Science Foundation Graduate Fellowships (2)
NDSEG Graduate Fellowships (2)
UI CS Grad Expo Top Team Presentation





Questions for my Graduate Students

What are we doing today to make our research group the best in the country?

How can I help you to facilitate this goal?



What is Important to Me?

—My Career (*Research, Teaching, Service*)



—Relationships with People
(*My Wife, Friends, Students, Colleagues*)



—Laughter!!!



—Exercise
(*Working out, Aerobics*)



What Have I Learned in Life?

The

“Ph”ive P’s

to

Personal

“Ph”ul”Ph”illment

and

Progress





Personal Relationships

Passion

“Ph”ailure

Persistence

Priorities





Service

Service

Service!





Important Question to Ask Yourself:

*How can I make the world
a better place today?*





The Penultimate Secret

#1: Just Show Up!



The Penultimate Secret

#2: People are Mirrors



The Final Secret

Pack People's Parachutes



Charles Plumb





**Everything
that I just said
may be
wrong!**





Acknowledgments

Janet A. Jokela (my wife)

My PhD students





Thank you

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