The Accelerated Underwriting (A) Working Group of the Life Insurance and Annuities (A) Committee met via conference call Oct. 2, 2019. The following Working Group members participated: Robert H. Muriel, Chair, Mike Chrysler, Vincent Tsang and Bruce Sartain (IL); Grace Arnold, Vice Chair, and John Robinson (MN); Jason Lapham (CO); Doug Ommen, Russ Gibson and Lindsay Bates (IA); Rich Piazza (LA); Cynthia Amann and Camille Anderson-Weddle (MO); Matt Holman (NE); Ross Hartley and Chris Aufenthie (ND); Jillian Froment and Peter Weber (OH); Elizabeth Kelleher Dwyer and Sarah Neil (RI); Scott Bird (WA); and Jerry DeArmand, Mary Kay Rodriguez, Sue Ezalarab and Lauren Van Buren (WI). Also participating were: Steve Oslund and Gina Hunt (AL); Jacob Lauten (AK); Ted Chang (CA); Manny Hidalgo (CT); Teresa Winer (GA); Karl Knable (IN); Barbara Torkelson and Tate Flott (KS); Nour Benchaboun (MD); Kendall Cotton (MT); Denise Lamy, and Karen McCallister (NH); Seong-min Eom (NJ); Annette James (NV); Peter Dumar and Bill Carmello (NY); Brian Hoffmeister and Lorrie Brouse (TN); Mike Boerner (TX); Tomasz Serbinowski (UT); and James Young (VA).

1. Discussed its Draft Work Plan

The Working Group members introduced themselves. There were a variety of divisions within the departments represented, as well as varying areas of expertise, years of service and levels of familiarity with the topics of accelerated underwriting and big data. Director Muriel explained that the Working Group received its charge “to consider the use of external data and data analytics in accelerated life underwriting, including consideration of the ongoing work of the Life Actuarial (A) Task Force on the issue and, if appropriate, drafting guidance for the states” from the Life Insurance and Annuities (A) Committee at the Summer National Meeting in response to a referral from the Big Data (EX) Working Group. He explained that the Big Data (EX) Working Group looked at how the use of data models for life insurance underwriting has become more common and identified a couple of issues initially, such as: 1) whether state insurance regulators should be examining vendors that are supplying data to insurers; and 2) whether vendors are supplying similar data and models to multiple insurers. He said that the Life Actuarial (A) Task Force is also focusing on the actuarial soundness of the new data being used and potential long-term solvency issues.

Director Muriel said the draft work plan sets an ambitious schedule for the Accelerated Underwriting (A) Working Group to complete its charge by the 2020 Fall National Meeting. He explained that the work plan starts with the Working Group spending the time between the 2019 Fall National Meeting and the 2020 Spring National Meeting gathering information. He said this phase is critical to ensuring that everyone participating in the process has a certain level of understanding, especially given the make-up of this Working Group. He said the Working Group will start with hearing a presentation at the Fall National Meeting from Patrick L. Brockett (The University of Texas at Austin), an accomplished academic in this area. Following this initial meeting in Texas, Director Muriel said he anticipated hearing additional presentations offering different perspectives, such as actuarial, industry, consumer and also other states. He suggested reaching out to Jennifer Cook (NAIC) with any suggestions for presenters. Director Muriel said the second phase of the work plan, between the 2020 Spring National Meeting and 2020 Summer National Meeting, has the Working Group identifying issues and discussing whether or what issues need to be addressed and the best ways to address them, whether that is a white paper, model bulletin, model law or something else. He said the last phase of the work plan envisions the Working Group developing a work product to bring to the Life Insurance and Annuities (A) Committee by the 2020 Fall National Meeting.

Director Muriel referenced the comment letter on the work plan submitted by Birny Birnbaum (Center for Economic Justice—CEJ), which raised the concern that the work plan contemplates spending too much time gathering information and revisiting issues that have been the subject of presentations and discussions at other NAIC groups over the past several years. Director Muriel said he appreciates Mr. Birnbaum’s comments and said the timing contemplated in the work plan is flexible and can be adjusted if, for example, the information gathering phase progresses more quickly. Additionally, Director Muriel offered to have Ms. Cook post on the Working Group’s web page materials from other groups that have spent time working on this issue, such as the Big Data (EX) Working Group and the Life Actuarial (A) Task Force.

Mr. Crofton said this Working Group should coordinate with the Artificial Intelligence (EX) Working Group in case there are areas of overlap. Ms. Amann said she participated in an InsurTech conference where there were presentations from a number of start-up companies and suggested working with Denise Matthews (NAIC) to obtain some of the presentations that were particularly informative. Leonard Mangini (American Academy of Actuaries—Academy) said the Working Group should be
aware of activities going on in other NAIC groups that touch on accelerated underwriting, such as APF 2018-17, which was added to the *Valuation Manual* and says when aggregating mortality experience, that experience must be based on the same or similar underwriting processes. Mr. Robinson asked whether the Working Group anticipates developing a work product in conjunction with the Life Actuarial (A) Task Force since the Working Group’s charge talks about coordination with the ongoing work of the Life Actuarial (A) Task Force.

Mr. Birnbaum explained his background and said that he has been involved in the myriad efforts at the NAIC in this area over the past several years. He asked the Working Group to consider moving more quickly than the time frames set out in the work plan. He said the Working Group should be able to gather sufficient information to get up to speed on these issues in a short amount of time because the practice of accelerated underwriting and the consumer issues implicated by the practice are well-known. He encouraged state insurance regulators to review the materials from the other NAIC groups that have been looking at these issues and move towards taking regulatory action as soon as possible.

Commissioner Ommen explained that this Working Group’s charge is explicitly mindful of the fact that there are other NAIC groups working on this issue. He said this Working Group’s charge has less to do with solvency, which is the purview of the Life Actuarial (A) Task Force, and more to do with equity and focusing beyond the responsibilities of the actuaries to evaluate whether consumers are being treated fairly. Commissioner Ommen said this Working Group has an important task, but he cautioned the group to do things correctly rather than just focus on moving quickly.

Having no further business, the Accelerated Underwriting (A) Working Group adjourned.
Accelerated Underwriting

BY DR. PATRICK BROCKETT
GUS WORTHAM CHAIR IN RISK MANAGEMENT AND INSURANCE
UNIVERSITY OF TEXAS AT AUSTIN
EDITOR, NORTH AMERICAN ACTUARIAL JOURNAL

Presented at the NAIC Meeting December 8, 2019
Austin, Texas
**Background Information**

- **Underwriting** in general is the process of classifying entities (bonds, insurance applicants, financial derivative instruments, etc.) into risk categories to determine the appropriate rate to charge for transferring the financial risk associated with the entity.
  - It is the process of evaluating risks, selecting which risks to accept, and identifying potential adverse selection.
  - Note: Underwriting is intrinsically discriminatory in the non-pejorative sense in that it is used to discriminate or distinguish between risk classes.

- **Underwriter in Insurance**: Individual who decides whether to insure exposures on which applications for insurance are submitted.
Life Insurance

Life insurance is based on three concepts:

- Pooling many similar risk exposures into a relatively homogeneous group
- Accumulating a fund through contributions (premiums) from the members of the group, and
- Paying from this fund for the losses of those who die each year.
- Essentially, insurance (and life insurance in particular) is a future performance contingent claims contract between the insurer and the insured and is similar to other future performance financial contracts.

Life underwriting is the process of deciding which life insurance applicants to accept, how to group them, how to charge them appropriate premiums for their risk class. Usually this involves assessing the person’s physical health, usually by blood work, urine analysis, doctor’s notes, physical exam, etc.
The yearly cost of mortality is the probability a person dies during the year times the face value (or amount of insurance). In addition to covering mortality costs, a life insurance premium which must be paid upon death. This is discounted back to the present for interest received on premiums received. Depending on the type of life insurance product, this is aggregated over the length of the contract.

The premium actually charged must reflect several adjustments.

Premises are based on the following:

- Projected losses
- + commissions and administrative expenses
- + risk charge
- + taxes
- - investment income on premiums.
## Characteristics of Major Types of Life Insurance Policies

<table>
<thead>
<tr>
<th>Type</th>
<th>Distinguishing Feature</th>
<th>Premiums</th>
<th>Cash Value</th>
<th>Death Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Term life</strong></td>
<td>Provides protection for a specific period (term)</td>
<td>Fixed, but increase at each renewal</td>
<td>None, thus no provision for loans or withdrawals</td>
<td>Pays face amount of policy if death occurs within term</td>
</tr>
<tr>
<td><strong>Whole life</strong></td>
<td>Lifetime protection: as long as premiums are paid, policy stays in force</td>
<td>Fixed</td>
<td>Guaranteed</td>
<td>Pays face amount if policy is in force when death occurs</td>
</tr>
</tbody>
</table>
| **Universal life** | Guaranteed minimum interest rate on the investments accumulated in the accounts. Interest rates are based on bonds only (not stocks) and can be higher than the minimum guaranteed | Flexible, set by policyholder; used to pay mortality rates and expenses, then remainder is invested | Depends on the account value minus surrender charges | Option A: maintains level death benefit  
Option B: face amount increases as accumulated cash value grows |
| **Variable life**  | The “mutual fund” policy, intended to keep death benefits apace with inflation; technically, a security as well as insurance | Fixed                                         | Not guaranteed; depends on investment performance of stocks | Minimum face amount that can be greater as cash value changes               |
| **Variable universal life** | Combines the premium and death benefit flexibility of a universal life policy with the investment choices in stocks of variable life | Flexible, as in universal life | Not guaranteed; depends on investment performance of stocks | Same options are universal life                                             |
What is Accelerated Underwriting?
What is Accelerated Underwriting?

“Any fully underwritten life insurance program that allows some applicants to forgo having a medical or paramedical exam and providing fluids, if they meet certain requirements and/or meet a certain pre-determined threshold.” (Klein & Rudolph, SOA 2019)

Accelerated Underwriting generally makes use of new data together with algorithmic tools and modeling techniques to risk-group applicants quickly without the necessity of bodily fluids, physician's notes, etc.

For those who qualify, the use of available digital data can reduce the underwriting decision time from 2-12 weeks down to no more than 48 hours.
Accelerated Underwriting typically...

- Issues a regular term life policy
- Policyholder pays the same rate as standard underwritten policies but underwriting decision is much faster
  - Could be more expensively priced product for the applicant than would be obtained using standard underwriting if he/she is in very good shape and would qualify for preferred rates with standard underwriting.
Accelerated Issue Insurance is not the same as Guaranteed Issue Insurance.

Guaranteed Issue refers to insurance coverage that is “guaranteed to be issued” to applicants - regardless of their health status, age, or income. You are not guaranteed coverage with accelerated underwriting. Different actuarially.
Accelerated Underwritten Insurance is not the same as Simplified Issue Insurance

- Simplified issue insurance means that there is no requirement for a physical exam. With Accelerated Underwriting there is an assessment of physical fitness, just obtained from digital data, not a physical.

- Simplified issue premiums are expected to be more expensive than if the applicant had undergone a full underwriting process. If underwritten with accelerated underwriting, have standard rates.
Who offers Accelerated Underwriting?

A plethora of companies offer Accelerated Underwriting.
How does AU differ from standard underwriting?

- (a) Technology (algorithms) used in place of bodily fluids for assessment
- (b) No requirement that applicant’s doctor give written statement
- (c) Data Sources often used by Insurer:
  - Prescription Histories
  - Motor Vehicle Records (MVR)
  - Medical Information Bureau (MIB)
  
  Checking Service and Insurance Activity Index can see hidden risks and stacking behavior of applicant (e.g., using many lower level policies limits to get excessive risk without running into a maximum coverage limit constraint)

- Applications and Interviews
- Consumer Data
- Credit scores
How does AU differ from standard underwriting? (continued)

- **(d)** Certain non-health factors also matter and vary by insurer:
  - No history of bankruptcy in the last 5-10 years
  - No history of driving recklessly or DWI within five years
  - No more than two moving violations in the past three years
  - No felony charges or convictions.

- **(e)** Minimum benefit amount is usually on the order of $100,000

- **(f)** Maximum benefit is usually on the order of $1,000,000
### Data Sets Used in Algorithms for AU

<table>
<thead>
<tr>
<th>TOP 10 UNDERWRITING TOOLS</th>
<th>WAIVE REQUIREMENTS</th>
<th>DETERMINE RISK CLASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescription histories</td>
<td>23</td>
<td>22</td>
</tr>
<tr>
<td>MIB</td>
<td>23</td>
<td>19</td>
</tr>
<tr>
<td>MVR</td>
<td>21</td>
<td>23</td>
</tr>
<tr>
<td>Electronic application</td>
<td>20</td>
<td>19</td>
</tr>
<tr>
<td>Tele-underwriting interview</td>
<td>18</td>
<td>19</td>
</tr>
<tr>
<td>Credit data</td>
<td>18</td>
<td>9</td>
</tr>
<tr>
<td>ID authentication</td>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>Consumer data</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Paper application</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>ID verification</td>
<td>8</td>
<td>3</td>
</tr>
</tbody>
</table>

*Other tools: Propensity to smoke model (1/0) and write-ins Public Record (2/1), Prior underwriting decisions (1/1), Other insurance coverage (1/0), Previous internal applications (1/0), Proprietary matrix (0/1)*

What if you don’t qualify for Accelerated Underwriting

- May need to go with full underwriting to get approved if certain negative risk factors show up during the information-gathering or not enough positive risk factors are present.

  - May need to go with full underwriting especially if you want preferred or super preferred rates.

  - You’ll then have to complete a medical exam (including bodily fluids) and get a doctor’s statement. This will lengthen the application process.
What are the positives of AU?

- Faster to the underwriting decision
- Cost reduction
- Less invasive to client
- Ease of doing business
- Standard or better underwriting
- More electronic, easier to file data.
- Possibly more accurate underwriting
- Attract younger clients via digital underwriting process
- Bias removal?
The insurance industry and procurement data are mainly regulated by state laws (natlawreview.com)

- As a result, underwriting practices will be more difficult to streamline.

- Increased digitalization opens insurers up to new data for underwriting use, but also possibly more fraud.

- Careful attention will have to be given to data privacy/security concerns

- Care must be taken when using machine learning and AI techniques to avoid “learned” statistical biases

- Models will have to be continuously updated to maintain accuracy.
Possible Areas of Controversy

- The use of social data in the underwriting process
  - Example: The use of credit scores is widely accepted now in the P&C industry, and certain aspects of financial history have long been used in life insurance (e.g., the applicant will have to justify if the amount of insurance desired is very much more than their income level). Other uses of credit history variables in life insurance may require further study to show it is a new (not already incorporated) predictor variable, and that it has independent predictive value. Never-the-less, better credit scores correlate with a longer life, so it may be a useful predictor. Credit-mortality score can be created just like credit insurance claim score was created for auto insurance.
  - Use of complicated underwriting algorithms does raise the possibility of unknown or unrecognized proxy discrimination, and makes underwriting decisions more difficult to explain to clients and regulators.
  - Social data is more susceptible to high variances and heteroskedasticity in estimated model weights.

- Foregoing certain fluid testing might result in adverse selection.
Preliminary Results from SOA Sponsored AU Study
Klein & Rudolph June 2019

- 27 life companies and 5 reinsurers responded to a survey on their AU programs.
- Related to data between 1/1/2017 to 9/30/2018.

<table>
<thead>
<tr>
<th>YEAR PROGRAM BEGAN</th>
<th>NUMBER OF COMPANIES</th>
<th>STILL IN TEST MODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>2018</td>
<td>10</td>
<td>2</td>
</tr>
</tbody>
</table>

Note: There will be an Expert Panel Discussion on AU on Dec 11, 2019 at SOA Offices (by O’Hare)
# Which Products Use AU?

<table>
<thead>
<tr>
<th>AU PRODUCTS</th>
<th>NUMBER OF COMPANIES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PRODUCT</strong></td>
<td></td>
</tr>
<tr>
<td>Term</td>
<td>23</td>
</tr>
<tr>
<td>Equity Index Life</td>
<td>10</td>
</tr>
<tr>
<td>Whole Life (Par/Nonpar)</td>
<td>9</td>
</tr>
<tr>
<td>Other UL (Other than ULSG)</td>
<td>9</td>
</tr>
<tr>
<td>UL with Secondary Guarantee</td>
<td>8</td>
</tr>
<tr>
<td>Variable UL</td>
<td>5</td>
</tr>
<tr>
<td>Interest Sensitive Whole Life</td>
<td>1</td>
</tr>
</tbody>
</table>

### Which Risk Classes Are Eligible?

<table>
<thead>
<tr>
<th>RISK CLASS LIMITATIONS</th>
<th>NONSMOKER</th>
<th>SMOKER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Available for all risk classes (i.e., no restrictions)</td>
<td>19</td>
<td>16</td>
</tr>
<tr>
<td>Available for a limited number of risk classes</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Not available for any risk classes</td>
<td>0</td>
<td>9</td>
</tr>
</tbody>
</table>

# AU Algorithms


## AU Eligible Applications

<table>
<thead>
<tr>
<th>NUMBER OF ALGORITHMS</th>
<th>NUMBER OF COMPANIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td>&gt; 2</td>
<td>1</td>
</tr>
</tbody>
</table>

## Who Created the Algorithm?

<table>
<thead>
<tr>
<th>RESOURCE</th>
<th>NUMBER OF COMPANIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal underwriting</td>
<td>23</td>
</tr>
<tr>
<td>Internal actuary</td>
<td>22</td>
</tr>
<tr>
<td>Reinsurer</td>
<td>15</td>
</tr>
<tr>
<td>Internal data scientist</td>
<td>11</td>
</tr>
<tr>
<td>Vendor</td>
<td>7</td>
</tr>
<tr>
<td>Consultant</td>
<td>4</td>
</tr>
</tbody>
</table>
How Does Mortality Experience Perform (vs. Expected) When Standard Underwriting Requirements Were Waived?

<table>
<thead>
<tr>
<th>Experience Was</th>
<th>When Requirements Waived</th>
<th>When Requirements Not Waived</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 10% Lower</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1%-10% Lower</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>The Same</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>1%-10% Higher</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>&gt; 10% Higher</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

Thank You

- Patrick Brockett
- brockett@utexas.edu

Note: There will be an expert panel discussion on AU on Dec 11, 2019 at SOA offices (by O’Hare Airport)
PATRICK LEE BROCKETT
December 2018

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        (512) 471-3322
FAX:    (512) 471-0587
E-mail: brockett@utexas.edu

CURRENT POSITIONS AT THE UNIVERSITY OF TEXAS AT AUSTIN
Director, Risk Management and Insurance Program
Gus S. Wortham Memorial Chair in Risk Management and Insurance
Director, Center for Risk Management and Insurance
Director of the Certificate in Risk Management program
Professor with joint appointments in the Departments of Information, Risk and
Operations Management; Finance; and Mathematics
Global Research Fellow at the IC² Institute, University of Texas at Austin
Affiliated Faculty Member, Division of Statistics + Scientific Computation
Fellow of the Humanities Research Institute, UT Austin

OTHER POSITIONS
Member of the Board of Directors, Texas Property and Casualty Guaranty
Association
Editor, North American Actuarial Journal
Associate Editor, Journal of Risk and Insurance
Board of Advisors of the Center of Insurance and Risk Management Studies
(CIRMS), York University, Toronto, Canada

EDUCATION
B.A.  1970, (Mathematics) California State University at Long Beach, California
M.A.  1975, (Mathematics) University of California at Irvine, California
Ph.D.  1975, (Mathematics) University of California at Irvine, California

EXTERNAL PROFESSIONAL HONORS AND AWARDS
The American Risk and Insurance Association, ARIA, (the premier academic association
in risk management and insurance in the world) has named a research award in my
name. The Patrick Brockett & Arnold Shapiro Actuarial Research Award, is to be
awarded for the article published in one of the Society of Actuaries or Casualty
Actuarial Society’s flagship academic journals (North American Actuarial Journal
or Variance) that makes the best contribution of interest to ARIA risk management
and insurance researchers. I served as Editor of ARIA’s Journal of Risk and
Insurance, and as President of ARIA and am currently Editor of the North American Actuarial Journal.

In 2017 I was awarded the 2017 Spencer L. Kimball Prize from the National Association of Insurance Commissioners, for the best article in the Journal of Insurance Regulation important to regulators. This was given for the article: Ai, Jing, Patrick L. Brockett, Linda Golden and Utai Pitaktong (2015) “How to Set Rates if You Must: An Efficiency-Based Methodology for Setting Promulgated Insurance Rates with an Application to Title Insurance” Journal of Insurance Regulation 34(7) 167-205

In 2017 I was awarded the 2017 Best North American Actuarial Journal Article Award, from the Society of Actuaries for the article: Golden, Linda, Patrick Brockett, Jing Ai and Bruce Kellison, (2016), "Empirical Evidence on the Use of Credit Scoring for Predicting Insurance Losses with Psycho-Social and Biochemical Explanations" North American Actuarial Journal 20(3) 233-251.

In 2017 the article entitled "The Journal of Risk and Insurance: Authors of Influence" by Steven W. Pottier, Jianren Xu, and Joshua D. Frederick (Risk Management and Insurance Review, December 2017, Vol. 20, No. 3, 339-362, DOI: 10.1111/rmir.12089) looked at authors who have published in the top tier Journal of Risk and Insurance from 1989 to 2010 based on the number of citations to these articles from 1989 to 2014. I ranked #3 in the world in terms of number of citations of articles published there, and #3 among all JRI authors in the world in terms of the number of non-insurance journal citations received.

In 2014 I was appointed as member of the National Academy of Sciences, Medicine and Engineering’s Committee to investigate affordability and availability in the National Flood Insurance Program (2014-2015)

In 2013 a paper entitled "The Most Prolific Contributing Authors to the Leading Risk Management and Insurance Journals: 1984-2013" by Jean Heck (Social Science Research Network) identified the most prolific contributors to the world’s three most elite journals in Risk Management and Insurance. In terms of the number of appearances I was ranked #9 in the world over the last 30 years and when the impact factor of the journal was taken into account, I ranked #2 in the world over the 30 year history. Also analyzed was the past ten years of contribution. In this I ranked #2 in the world overall, and once the impact factor of the journal was taken into account, I rose to #1 in the world.

In 2013 I was appointed as member of National Academy of Sciences’ National Research Council Committee to investigate costs and benefits of reforms to the National Flood Insurance Program (2013-2014)

In 2011 I was awarded the American Risk and Insurance Association’s Excellence in Teaching Award, August, 2011 at annual meeting in San Diego, California
In 2011 I was appointed as a member of National Academy of Sciences’ Water Resources Board’s panel to investigate risks in the levee systems in America and the National Flood Insurance Program (2011-2012).


Ranked as the 12th most impactful scholar (non-tied ranking) among 1,376 management science (MS)/production and operations management (POM) professors in 225 American business schools in the USA according to the H-index of scholarly productivity and impact. The H-index is a citation based methodology for determining the impact of a scholar which does not place undue emphasis on the “one hit” authors, or people who churn out numerous papers which are never cited by others, as might a simple web of science citation count. The H-index quantifies both the actual scientific productivity and the apparent scientific impact of a scientist. The index is based on the set of the scientist's most cited papers and the number of citations that they have received in other people's publications. The index was suggested by the physicist Jorge E. Hirsch as a tool for determining theoretical physicists' relative quality, was published in the Proceeding of the National Academy of Sciences, and is sometimes called the Hirsch index or Hirsch number. The MS/POM scholarly impact study research, which took almost a year to complete, was conducted at DePaul University by Bin Jiang and I was informed of the results via email in 2008.

Casualty Actuarial Society’s ARIA Research Prize 2008 given to “the author(s) of that paper published by the American Risk and Insurance Association (ARIA) which provides the most valuable contribution to casualty actuarial science” awarded by the Casualty Actuarial Society. For the paper by Patrick L. Brockett, and Linda L. Golden entitled “Biological and Psychobehavioral Correlates of Risk Taking, Credit Scores, and Automobile Insurance Losses: Toward an Explication of Why Credit Scoring Works,” The Journal of Risk and Insurance, 74(1), March 2007. 23-63.

Elected Fellow of the Institute for Risk Management (2008)

American Risk and Insurance Association Outstanding Achievement Award, August 2006, for furthering the science of risk management through the promotion of education, research and communication during my nine year tenure as editor of The Journal of Risk and Insurance from 1998-2006.

Elected Member of the International Statistical Institute 2006. This is a very prestigious election of only a select few statisticians worldwide.


Casualty Actuarial Society’s ARIA Research Prize 2003 given to “the author(s) of that paper published by the American Risk and Insurance Association (ARIA) which provides the most valuable contribution to casualty actuarial science” by the Casualty Actuarial Society. For the paper by Patrick L. Brockett, Richard A., Derrig, Linda L. Golden, Arnold Levine and Mark I. Alpert entitled “Fraud Classification Using Principal Component Analysis of RIDITs,” The Journal of Risk and Insurance, 2002 69(3), 341-372.


Holder of the Thomas Boles Chair in Actuarial Science, Georgia State University, Atlanta, Georgia, 1998


ELECTED PROFESSIONAL SOCIETY FELLOWSHIPS AND HONORS

The Institute of Risk Management (Elected Fellow)
International Statistical Institute (Elected Member)
The American Association for the Advancement of Science (Elected Fellow)
The Institute of Mathematical Statistics (Elected Fellow)
The American Statistical Association (Elected Fellow)
The Royal Statistical Society Fellow
(also elected Chartered Statistician by RSS)
The Operations Research Society of America (now INFORMS) (elected Full Member when it was ORSA)

OTHER PROFESSIONAL SOCIETY MEMBERSHIPS

Academy of Marketing Science
American Marketing Association
American Risk and Insurance Association (Past President)
Asia Pacific Risk and Insurance Association
Casualty Actuarial Society (Academic Corresponding Member)
Institute for Operations Research and Management Sciences (INFORMS)
International Actuarial Association (Individual Life Member, ASTIN section)
Society for Marketing Advancements
Southern Risk and Insurance Association
Western Risk and Insurance Association

CURRENT EDITORIAL POSITIONS

2014- Editor, North American Actuarial Journal (Society of Actuaries’ flagship journal and one of the top two actuarial journals worldwide)
2007-2019 Associate Editor, The Journal of Risk and Insurance (American Risk and Insurance Association’s flagship journal and the very top journal worldwide)

PREVIOUS EDITORIAL POSITIONS

2008-2015 Editorial Board Member, Journal of International Business and Entrepreneurship
2000-2014 Member of Distinguished Honorary Editorial Board, *North American Actuarial Journal*. This position is for a selected few who not only serve on the Editorial Board, but also have been chosen to give advice on strategy and directions to the Editor.


1984-2008 Associate Editor, *Insurance: Mathematics and Economics*, one of the very top journals in actuarial science and insurance mathematics published in Europe

1998-2007 Editor, *The Journal of Risk and Insurance*, the flagship journal of the American Risk and Insurance Association and the most prestigious academic journal in risk management and insurance in the world


1999 Special Guest Editor of the *North American Actuarial Journal* Special Issue (January) on Genetic Testing and its Impact on the Insurance Industry

1997 Co-Editor (with W.W. Cooper, A. Berger, and J. Pastor) Special Issue of the *European Journal of Operations Research* on new methodologies and directions in the evaluation of financial institutions.

1995-2000 Associate Editor, *North American Actuarial Journal*, the flagship journal of the Society of Actuaries and the most prestigious academic journal in actuarial science in North America


1991-1993 Associate Editor, *Naval Research Logistics*

1979-1980 Associate Editor, Book Review Section, *Journal of the American Statistical Association*

**UNIVERSITY PROFESSIONAL HONORS AND AWARDS RECEIVED**

Global Research Fellow IC² Institute, University of Texas

Fellow of the Humanities Research Institute at the University of Texas (2011)

Deans Fellow: McCombs School of Business (Spring 2010)

Deans Fellow: McCombs School of Business (Spring 2005)

Dean’s Fellow 1998, University of Texas at Austin College and Graduate School of Business

Outstanding Graduate Teacher Award (University-wide competition), by The University of Texas at Austin Graduate School, 1995.
Award for Research Excellence, presented by The University of Texas CBA Foundation Advisory Council (1992)
Faculty Research Assignment, University of Texas Graduate School (Spring 1991)
Award for Research Excellence, presented by The University of Texas CBA Foundation Advisory Council (1984)

OTHER UNIVERSITY PROFESSIONAL AWARD NOMINATIONS
Information, Risk and Operations Management Department Nominee for College-wide Career Award for Outstanding Research Contributions (2015)
Information, Risk and Operations Management Department Nominee for College-wide Career Award for Outstanding Research Contributions (2014)
Management Science and Information Systems Department Nominee for College-wide Award for Outstanding Research Contributions (2006)
Management Science and Information Systems Department Nominee for University-wide Outstanding Graduate Teacher Award (1993)
Finance Department Nominee for College-wide Award for Research Excellence, (1991)
Nominated for Outstanding Professor Award, The Graduate Business Council (1987)
Nominated for Friar Society Teaching Award (1987)
Finance Department Nominee for University-wide Outstanding Graduate Teacher Award, (1989, 1992, and 1993)
Nominated for Outstanding Researcher Award, Golden Key National Honor Society (1987)
Nominated for Outstanding Teacher Award, Golden Key National Honor Society (1985)

OFFICES IN PROFESSIONAL ORGANIZATIONS AND PROFESSIONAL SERVICE

2000-2020 Member of Board of Directors, Texas Property and Liability Insurance Guaranty Association (Appointed as a Public Member by the Texas State Commissioner of Insurance)
2010-2013 Member of the Theory of Risk Committee of the Casualty Actuarial Society,
2009-2018 Chair, ARIA Actuarial Research Award Committee, American Risk and Insurance Association. Raise funds for award
Co-Organizer 6th Longevity Risk and Capital Market Solutions Conference, Sydney, Australia, September 2010
Member of the Committee to determine the Robert I. Meir Award for the most outstanding article published in The Journal of Risk and Insurance
ten years previously which has “withstood the test of time”, given by the American Risk and Insurance Association

2009

Member of the Theory of Risk Committee of the Casualty Actuarial Society, 2009

Chair, Ad hoc committee on ARIA Actuarial Research Award, American Risk and Insurance Association


Member of the Committee to determine the Robert I. Meir Award for the most outstanding article published in *The Journal of Risk and Insurance* ten years previously which has “withstood the test of time”, given by the American Risk and Insurance Association

2008

Member of the Theory of Risk Committee of the Casualty Actuarial Society, 2008

Member of the Wright –Kulp Book Award Committee to determine the most outstanding contribution to the risk management literature, sponsored by the American Risk and Insurance Association

Completed (with Professor Richard MacMinn) the raising of funds for the American Risk and Insurance Association (ARIA) to establish an endowment for a research award titled “The Robert C. Witt Award” for the most outstanding feature article published each year in the *Journal of Risk and Insurance*. This Award is given by ARIA in honor of former UT risk management and insurance professor Robert C. Witt.

Member of the Committee to determine the Robert I. Meir Award for the most outstanding article published in *The Journal of Risk and Insurance* ten years previously which has “withstood the test of time”, given by the American Risk and Insurance Association

2004-2007

Member of the Board of Directors, Board on Mathematical Sciences and their Applications, National Research Council, The National Academies of the United States

2007

Member of the Committee to determine the Robert I. Meir Award for the most outstanding article published in *The Journal of Risk and Insurance* ten years previously which has “withstood the test of time”, given by the American Risk and Insurance Association

1998-2006

Co-Chair (with Richard MacMinn) of the Meir Award for the most outstanding article published in *The Journal of Risk and Insurance* ten years previously which has “withstood the test of time”, given by the American Risk and Insurance Association

2002-2003

Immediate Past President, American Risk and Insurance Association.

1999-2003

Executive Committee Member for the Board of Directors, American Risk and Insurance Association.
2002-2003 Chair, Officer Nomination Committee, American Risk and Insurance Association.
2000-2001 Chair, Finance Committee, American Risk and Insurance Association
2000-2001 Chair, Strategic Planning Committee, American Risk and Insurance Association
2000-2001 President-Elect, American Risk and Insurance Association
1999-2000 Member of the Society of Actuaries Task Force on Education and Qualifications 2000-2005
2000-2006 Liaison, Society of Actuaries with the American Association for the Advancement of Science
2000 Organizer of International Annual Convention, American Risk and Insurance Association (2000)
1999-2000 Vice President, American Risk and Insurance Association
1996-2001 Member of Board of Directors, American Risk and Insurance Association
1998-2006 Co-Chair (with Richard MacMinn) of the Meir Award for the most outstanding article published in *The Journal of Risk and Insurance* ten years previously which has “withstood the test of time”, given by the American Risk and Insurance Association
2002-2003 Co-Chair (with Richard MacMinn) of the Robert C. Witt Award for the most outstanding article published in *The Journal of Risk and Insurance* during the previous year, by the American Risk and Insurance Association
1998 Organizer, Bowles Symposium on Genetic Technology and its Impact on Insurance Underwriting, Georgia State University, March 1998
1991 Member of the Committee to determine Kulp-Wright book awards given by the American Risk and Insurance Association
1990 Member of the Committee to Determine Stickler Teaching Innovation Award given by the American Risk and Insurance Association
1987-1988 Member of the Nominating Committee for the American Risk and Insurance Association
1986-1988 Supervisor and organizer of the Society of Actuaries examinations for the Austin, Texas examination center
1985-1989 Member of the National Science Foundation Measurement Methods and Data Improvement Advisory Panel
1985 Member of the Program Coordinating Committee for the Annual Meeting of the American Risk and Insurance Association
1985-95 Member of the Society of Actuaries Committee on Relations With Statistical Societies

1984 Co-organizer (with S.H. Cox), Twentieth Annual Actuarial Research Conference, sponsored by the Society of Actuaries

1979 President, Austin Chapter of the American Statistical Association

1978 Vice President, Austin Chapter of the American Statistical Association

PUBLICATIONS

Books


Monographs

Brockett, Patrick L. and Patricia Arnold 2004 “Deregulation, Pricing and Availability Issues in the Texas Homeowners Insurance Market” (Fall) 2004 monograph, *Texas Public Policy Foundation*


Articles on Risk Management and Insurance


Brockett, Patrick L. 1983. "Risk Equivalent Return on Shareholders' Equity and Utility Assessment--a Comment on the paper by A. Longley-Cook," *Transactions of the Society of Actuaries*, Vol. 35, 341-348. (This article was a finalist for the Halmsted Prize given by the Society of Actuaries for the best English language publication of the year in the world in Actuarial Science).


Insurance Association “for that journal article making a ten year lasting contribution to risk management” and having “withstood the test of time”.


Brockett, Patrick L., Hung-Gay Fung, Gene C. Lai, Richard D. MacMinn, and Robert C. Witt. December 2000. “Great (and not so Great) Expectations: An Endogenous Economic Explication of Insurance Cycles and Liability Crises,” *The Journal of Risk and Insurance*, Vol. 67, No. 4. (Dec., 2000), pp. 617-652. (This paper won Second Prize in the International Brian Hey Prize Competition held by the Institute of Actuaries in England and the Scottish Faculty of Actuaries, presented October, 2000. This paper also won the ARIA Research Prize given by the Casualty Actuarial Society August 14, 2001 to “the author(s) of that paper published by the American Risk and Insurance Association (ARIA) which provides the most valuable contribution to casualty actuarial science”.)
Alpert, Mark, Patrick L. Brockett, Richard A. Derrig, Linda L. Golden, and Arnold Levine. September 2002. "Fraud Classification Using Principal Component Analysis of RIDITs," *The Journal of Risk and Insurance* Volume 69 Number 3, 341-372. (This paper won the ARIA Research Prize given by the Casualty Actuarial Society August 2003 to “the author(s) of that paper published by the American Risk and Insurance Association (ARIA) which provides the most valuable contribution to casualty actuarial science”.)

Brockett, Patrick L., and Bruce Kellison. March 2003. “Credit History and Insurance Losses: Is There a Connection?” *Texas Business Review*


Brockett, Patrick L. and Linda L. Golden 2007, “Biological and Psychobehavioral Correlates of Risk Taking, Credit Scores, and Automobile Insurance Losses: Toward an Explication of Why Credit Scoring Works,” *The Journal of Risk and Insurance*, Vol 74(1), 23-63. This paper won the Casualty Actuarial Society’s ARIA Research Prize 2008 given to “the author(s) of that paper published by the American Risk and Insurance Association (ARIA) which provides the most valuable contribution to casualty actuarial science” by the Casualty Actuarial Society.


Articles on Theoretical Probability, Statistics, and Stochastic Processes


Brockett, Patrick L., and J. Zhang. August 1987. "Quadratically Constrained Information Theoretic Analysis," *SIAM Journal of Applied Mathematics*, Vol. 47, No. 4, 871-885. (This article was nominated for the award by the American Statistical Association for the most outstanding statistical application paper of the year.)


**Articles on Business and Social Science**


Brockett, Patrick L., William W. Cooper, K. H. Kwon and T. W. Ruefli, 2003 “Authors’ Reply”, Omega, 31 No. 5 Pages 417-421


**Book Reviews**


**GRANTS AND CONTRACTS RECEIVED**

2013 Securities and Exchange Commission, 16 hours of lectures on insurance and capital markets

2013 2015 Received AARP grant to study Medicare Fraud

2009-2013 Insurance Council of Texas, $4,500 each year for faculty research support in risk management

2004-5 Graduate Student Research Support for Legislatively Mandated Credit Scoring and Insurance Study Texas Department of Insurance, about $60,000

Faculty Research Support for Legislatively Mandated Credit Scoring and Insurance Study, given by Texas Department of Insurance, about $40,000

Psychological and biological correlates of risk taking, given by Actuarial Education and Research Foundation (AERF). (with Linda L. Golden co-PI), $22,500

Research on Detection of Insurance Fraud in Insurance in Spain, given by the Spanish Government, about 15,000 Euros.
2002-3  Statistical Analysis of Credit Scoring and Insurance Losses, given by the Texas State Lt Governor’s Office, about $55,000 plus equipment (with Bruce Kellison).


“Alternative Technical Methods for Predicting Insolvency of Life and Health Companies” (with James Jarrett), from the Texas Department of Insurance

“A Validation of the Texas Early Warning System” (with James Jarrett), from the Texas Department of Insurance


Research Grant from The Actuarial Education and Research Fund of The Society of Actuaries for “Operations Research in Insurance”


University Research Institute-Small Research Grant ($500)
University Research Institute - Faculty Research Assignment (One semester off with pay for Spring 1991)

1989-1990  CBA Faculty Academic Development and Research Committee - Summer research award

University Research Institute-Small Research Grant ($500)

“Information Theoretic Unification of Solutions of Problems in Actuarial Science: Research and Study Note.” Granting Organization: Actuarial Education and Research Fund (AERF), Society of Actuaries

1988-1989  CBA Faculty Academic Development and Research Committee - Summer research award

1987-1988  “Chebychev Systems of Functions as a Unifying Technique for some problems in Finance, Economics, and Insurance.” College of Business Administration Summer Research Award

1986-1987  “Information Theoretic Analysis of Discrete Data.” Granting Organization: College of Business Administration Summer Research Award


1976  “Admissible Transformations of Measures on Locally Compact Groups.”
Granting Organization: Tulane University Committee on Faculty Research

INVITED ADDRESSES, LECTURES, AND PAPERS PRESENTED

1974  "An Index for Convergence of Sums of Independent Random Variables,"
November 1974 meeting of the American Mathematical Society at the University of Southern California

1975  "A Methodology for Inverting Mixing Distributions," April 1975, University of Wisconsin-Parkside Mathematics Department

"Estimating Mixing Distribution Functions via Moments," Tulane University Mathematics Department, New Orleans, April 1975


"Support of Infinitely Divisible Measures on Hilbert Space," special session on probability and statistics, November 1976, meeting of American Mathematical Statistics in Albuquerque, New Mexico

1977  "Design and Mathematical Analysis of Questionnaires," Colloquium Lecture, Department of General Business, December 1977, The University of Texas at Austin


Chairman, session on Probability Theory and Stochastic Processes, January 5, 1978 Annual Meeting of American Mathematical Society, Atlanta, Georgia


“Zeros of the Densities of Infinitely Divisible Probability Measures,” Colloquium, Mathematics Department, Tulane University, October 1978
“Information Theory and Statistics,” Mathematics Department Colloquium, Tulane University, October 1978

1979
“Recognition of Trends in Health Monitoring Systems with Low Reliability Data,” Austin Chapter, American Statistical Association, January 1979 meeting
“Discriminant Analysis with Categorical Information,” invited talk, April 30, 1979 meeting, Operations Research Society of America, New Orleans
“Non-parametric Tests for Trends,” Department of Mathematics Colloquium Lecture, Tulane University, May 1979
“Information Theoretic Discrete Variable Selection,” June 1979 meeting of the Institute of Mathematical Statistics, Los Angeles
“Minimum Discrimination Information Estimation via Unconstrained dual Convex Programming,” September 1979, Fifth Congress of the National Academy of Engineering of Mexico (National Academy of Sciences of Mexico), Morelia, Mexico
“Monitoring Adverse Reactions to Drugs by Non-parametric Statistical Methods,” October 1979, Colloquium, University of Louisville, Louisville, Kentucky

1980
“Discrimination Without Training Samples, with Applications to World Health Organization Data,” February 1980, Department of Statistics Colloquium, University of California, Riverside
“High-Low Discriminant Analysis of Categorical Data Using RIDITS,” invited presentation for session on discriminant analysis, Biometric Society Meeting, March 1980, Charleston, South Carolina
“Statistical Techniques for Determining Fitness to Fly,” March 1980, Brooks Air Force School of Aerospace Medicine, San Antonio, Texas
“Unimodality of High Convolutions,” Department of Mathematics Colloquium, October 1980, University of California, Riverside
“Using Time Dependent Covariates to Assess Survival Probabilities with an Application to Heart Disease,” December 1980, Colloquium, University of California, Irvine, Community & Environmental Medicine, and Southern Occupational Health Center

1981
“Analysis of Categorical Questionnaires with an Application to Marketing Research,” Seminar in the Finance Workshop, January 1981, Graduate School of Management, University of California, Irvine
“A Periodic Check Up Statistical Model for Heart Disease in Air Force Fliers,” February 1981 Colloquium, California State University at Long Beach
“Periodic Check Up Survival Analysis Model,” April 1981 Colloquium, Department of Statistics, University of California, Riverside
1982  “Self Insurance and Regret,” April 1982, Risk Theory Seminar (Sponsored by the American Risk and Insurance Association), Columbus, Ohio

   “Likelihood Detection for Infinitely Divisible Processes,” February 1983, Department of Mathematics Colloquium, Tulane University
   “Non-Parametric Density Estimation,” June-July 1983, Non Gaussian Signal Processing Conference (sponsored by the Office of Naval Research)
   Organizer and chairman of Special Session on Quantitative Methods in Financial Decision Analysis, Operations Research Society of America, November 1983

   "Constructing a Unimodal Prior Distribution," National Academy of Engineering of Mexico, Cuidad Obregon, Sonora, Mexico, September 1984

   "Information Theoretic Methods for Insurance Calculations," August 1985, American Risk And Insurance Association annual meeting, Vancouver, British Columbia, Canada


1987  "Comparison of Risk Characteristics of Individual Decision Makers," (invited) International Risk Theory Symposium, Mathematics Institute, Oberwolfach, Germany
   "The Contributions of A. Charnes to Statistical Thought," (with L. Seiford), Symposium Honoring A. Charnes on his Seventieth Birthday, Austin Texas

1990  "Linear and Nonlinear Time Series Models in the Financial Theory of Insurance Companies," (co-authored with Robert C. Witt), Invited lecturer at the American Statistical Association Annual Meeting, Anaheim, California. This session was jointly sponsored by the Business and Economic Statistics section of the ASA and by the Society of Actuaries

"Stochastic Process Models for Ventured Capital Decisions," (with Samuel Cox, and James Gerberman), Business and Economic Statistic section of the American Statistical Association annual meeting, Anaheim, California


Discussant of the paper "Fuzzy Trends in Automobile Insurance," by J. David Cummins and Richard Derrig, at the American Risk and Insurance Association Annual Meeting in Orlando, Florida

1991  "Fun With Moment Problems--The Schmitter Problem," (invited) International Risk Theory Symposium, Mathematics Institute, Oberwolfach, Germany


1992  "Venture Capital Financing," Instituto Tecnologico De Monterey, April 10-11, 1992, Mexico City, Mexico


"Using Neural Networks to Detect Early Warnings of Insurance Company Insolvencies," (with Linda L. Golden, Utai Pitaktong, and W.W. Cooper), August
1993, American Risk and Insurance Association Annual Meeting, San Francisco, California

"Environmental Liability: The Role of Insurance," American Public Power Association (invited), October 1993, Austin, Texas

Selected member of an eight-person international group of medical informatics specialists to go to Hungary (Budapest and Szeged) and Russia (Moscow and St. Petersburg) and meet with academic and scientific colleagues, and members of the Academy of Sciences in these countries


1994  
"New Approach to Event Study Methodology with an Application to Proposition 103," August 1994, American Risk and Insurance Association Meeting


"Information Theoretic Applications to Actuarial Science," Meeting on Risk Theory, September 18-14, 1994, Mathematics Research Institute, Oberwolfach, Germany


1995  

"Kohonen Feature Maps for Detecting Bodily Injury Fraud Claims in Automobile Insurance," January 1995, Massachusetts Automobile Insurance Bureau, Boston, Massachusetts

"Risk Management for Software Development Companies," American Defense Preparedness Association Test & Evaluation Symposium XI, January 31, 1995, held at the IC^2 Institute, Austin, Texas

"Rank Statistical Methods for Detecting Efficiency Differences in Intertemporal DEA Analysis," Computational Economics Society Meeting, May 1995 Austin, Texas

“Information Asymmetries and Insurance Futures Options,” The Bowles Symposium on the Securitization of Insurance Risks, May 24-26, 1995 Georgia State University, Atlanta, Georgia


“The Use and Impact of Information Technology and the Internet on Risk Management and Insurance,” Presented to the Austin Chapter of the CPCU, 1996


Houston Marine Insurance Seminar, attended and received $10,000 in scholarships for students in Risk Management and Insurance, Houston, Texas September, 1996

“Provider Autonomy and the Efficiency of HMOs,” 1996, Health Care Management Seminar, University of Texas at Austin

“Risk Management and Business Risk”, October 1996, Videotaped Interview for a PBS film documentary to be aired in 1997

Society of Actuaries Annual Meeting, attended and received Annual Prize for most outstanding publication in the Transactions of the Society of Actuaries for the year 1996, Orlando, Florida, November 1996


“Current Issues and Research Topics in Risk Management,” Actuaries Club of the Southwest, November 2000

2001 "Fraud Classification Using Principal Component Analysis of RIDITs" July, international Insurance Mathematics and Economics conference, invited Plenary Keynote address, Penn State University, State University Penn.

"DEA Evaluation of Efficiency of Marketing Distribution Systems in the U.S. Property-Liability Insurance Industry: A Financial Intermediary Approach"
Western Risk and Insurance Association annual Meeting, January, 2001, Santa Barbara, Calif.


“The History and Future of Risk Research” Invited Presidential Address, American Risk and Insurance Association Annual Meeting, Indianapolis, IN. August, 2001


“Genetic Testing and Insurance” (with Richard MacMinn), Center for Risk and Insurance of the University of Nottingham Conference, London, England, April (Invited)

“Efficiency and Title Insurance” (with W.W. Cooper and U. Pitaktong) presented to the Western Risk and Insurance Association Annual Meeting, January.

“Technology and Risk Management” Session Chair at the Western Risk and Insurance Association Annual Meeting, January.

“The Role of Howard Tucker in Graduate Education” at Festschrift for Howard Tucker’s 80th birthday Celebration, Irvine, California, October


“Genetic Testing and Adverse Selection” (with Richard MacMinn and J.A. Raeburn) presented at the Southern Risk and Insurance Association Meetings in Clearwater, 2003,

“Economic Aspects of Genetic Testing” (with Richard MacMinn) presented at the European Group of Insurance Economist meeting, Zurich, Switzerland September 2003


“Credit Scoring and Insurance Underwriting” Testimony before the Texas Senate, February, 2003

“Credit Scoring and Insurance” Automobile Agents of Texas annual meeting, Keynote speech, San Antonio, TX


"Fraud Classification Using Principal Component Analysis of RIDITs,” Casualty Actuarial Society Annual Conference, May, 2004 (invited to present our ARIA Award winning paper), Colorado Springs, Colorado.


“Detecting Insurance Fraud using Principal Component Analysis of RIDITS,” Presented to the Austin Chapter of the American Statistical Association, Austin Texas 2004

2005 “Legislative Issues in insurance Regulation” 4th Annual Policy Orientation for the Texas Legislature, sponsored by the Texas Public Policy Research Foundation, Austin, TX, January 2005

“Information Theoretic Approach to Statistical Theory and Probabilistic Understanding” Austin Chapter, American Statistical Association, February 24, 2005

“Education and Research Directions in Actuarial Science in the United States” University of Valencia, Spain, March 2005
“Information Theoretic Approach to Statistical Reasoning with Applications to Actuarial Science” University of Barcelona, Spain, April 2005

“Overview of Trends in the US Insurance Market on Insurance Research” Tsinghua University, China, May 23, 2005

“The Relevance of Information Theory for Risk Analysis” A Unifying Philosophical Approach to Thought and Risk”, Tsinghua University, China, May 23, 2005

“Introduction to and Overview of Data Envelopment Analysis” Tsinghua University, May 24, 2005

“Using DEA to Assess the Efficiency of the Insurance Market” Tsinghua University, May 24, 2005

“Detecting Consumer Fraud using PRIDIT Analysis” Fudan University, China, May 23, 2005

“Biological and Psychological Influences on Risk Taking” (with Linda L. Golden and Sandra Dunn), presented to the World Risk and Insurance Economics Conference held in Salt Lake City, August 2005. Papers are competitively reviewed.

Chaired session and served as Discussant on paper on securitization of longevity risk at World Risk and Insurance Economics Conference held in Salt Lake City, August 2005.

2006-


2007


“A Psychological and Biological Explanation of Why Credit Scoring Works,” Faculty Research Presentation to McCombs students, November 6, 2007 (joint with Linda L Golden).


2008

“Quantifying Enterprise Risk Management using Chance Constrained Programming” (with Jing Ai, Linda Golden and William Cooper) Keynote
address at the International Actuarial Conference honoring Harry Panjer’s retirement, University of Waterloo, Waterloo Ontario, Canada April 11-13, 2008


“Weather Derivatives for Mitigating Weather Related Risks” (with Linda Golden, Charles Yang and Hong Zou) invited lecture at the 5th Conference in Actuarial Science and Finance, University of the Aegean, Samos, Greece September 1-6, 2008.

“Sociopsychological and Biological Influences on Risk Taking: A Consumer Finance Perspective” (with Linda L. Golden) invited seminar presentation at the University of New Mexico School of Business, Albuquerque, New Mexico, November 7, 2008.


2009


“The Origins and Implications of the Financial Crisis” invited seminar, University of Granada, Granada, Spain, April, 2009


“An Investigation of Fraud Rate Estimation: Model Applications to the USA and Spain” (with Jing Ai, Linda L. Golden, and Montserrat Guillen), presented at the


Chaired Research Session, at the American Risk and Insurance (ARIA) Annual Conference, Providence, Rhode Island, August, 2009


“Internet Survey Research: Triumphs, Trials, and Tribulations -An Application to Swine Flu.” With Linda L. Golden, Faculty Research Presentation, November 12, 2009. This was the highest attended faculty research presentation ever according to a note we received afterwards.

2010 “Credit and Basis Risk Management Arising From Hedging Weather Related Risks Using Weather Derivatives,” (with Linda L. Golden and Charles Yang), Department of Finance, University of Hawaii, Manoa, February 5, 2010

“Health Belief Model Implications for Motivating H1N1 Prevention Behaviors” (with Linda L. Golden and Danae Manika) Health Literacy: Communicating with Underserved Populations Research Conference, sponsored by Center for Health Promotion Research, University of Texas, Austin, Texas March 3, 2010

“Identifying and Detecting Consumer Fraud” (with Linda L. Golden), Invited presentation, University of Granada, Granada, Spain, March, 2010

“Consumer Risk Taking and Perceptions of Risk”, Invited presentation, University of Granada, Granada, Spain, March, 2010


“Insurance Company Insolvency and Guaranty Funds: History and Trends” Invited presentation at the National Conference of Insurance Guarantee Funds, San Francisco, California April 27,28, 2010

“Internet-Based Survey Research: Methodological Issues” Discussant for the session, Academy of Marketing Science, Portland, Oregon, May 29, 2010
“A Strategic Allocation of Capital Approach to Enterprise Risk Management” (With Linda Golden and Jing Ai) 6th Conference in Actuarial Science and Finance, University of the Aegean, Samos, Greece June 1-6, 2010


“Using DEA to Assist the Regulator in Setting Promulgated Insurance Rates” (with Jing Ai, Linda L. Golden, Utai Pitaktong and Charles Yang) INFORMS Annual Meeting, Austin, Texas November 10, 2010

2011

“Developing Effective Public Prevention Messages: The Case of the H1N1 Flu” (with DanaeManika, and Linda Golden), presented at the Symposium for Innovation in Health Care Delivery Systems: Improving Systems for Improving Health and Health Behaviors, McCombs School, University of Texas at Austin, April.


“An Overview of Capital Market Solutions to Longevity Risk Problems with an Application to J.P. Morgan’s q-forward Derivative” (with Yinglu Deng and
Richard MacMinn). American Risk and Insurance Association Annual Meeting August 7-10, 2011 San Diego, California

“Usage of Credit Scores in Insurance Classification and Pricing” (with Jing Ai, Linda L. Golden, and Bruce Kellison, American Risk and Insurance Association Annual Meeting August 7-10, 2011 San Diego, California

Invited Discussant of “Bond Insurers: Avoiding Capital Pro-cyclicality” by Xiangjing Wei, Shaun Wang, and Eric Ulm, Georgia State University, American Risk and Insurance Association Annual Meeting August 7-10, 2011 San Diego, California

“Is the U.S. Life Insurance Industry in Danger of Systemic Risk by Using Hedging Derivatives?” (with Tom Sager, Bo Shi, and Etti Baranoff, American Risk and Insurance Association Annual Meeting August 7-10, 2011 San Diego, California

“Longevity Risk and Capital Markets” Invited Presentation at the University of Hawaii, Department of Finance, August-September, 2011


“Behavioral Aspects of Credit Scoring” (with Jing Ai, Linda L. Golden, and Bruce Kellison), INFORMS Annual Meeting, Charlotte, North Carolina, November, 2011

2012 “Use of Credit Scores in Insurance Classification and Pricing,” (with Jing Ai, Linda L. Golden, and Bruce Kellison), Western Risk and Insurance Association (WRIA) annual meeting, Kona, Hawaii, January 2012

“Developments in Mobile Commerce: Economic Opportunities, Risk Analysis and Risk Management” (with Linda Golden and Anji Song), University of Granada, Granada, Spain, March, 2012

“Health care developments in m-commerce and associated issues for risk management,” (with Linda Golden, Ilya Dayter, and Danae Manika), presented at the McCombs School of Business Health Care Research Symposium at The University of Texas at Austin, Austin, TX, April, 2012.

“Risk: Public and Private” Humanities Research Institute Fellows Program lecture, University of Texas at Austin, April 26, 2012


“Modeling Mortality: History, Models and Uses” A three hour special invited presentation at the Tsinghua University Workshop on Insurance Research, Qingdao, China July 16, 2012


“Predicting Individuals’ Insured Losses: Psychology, Responsibility, and Quantitative Correlates, (with Jing Ai, Linda L. Golden, and Bruce Kellison), Asia Pacific Risk and Insurance Association annual meeting, Seoul, Korea, July 2012

“Modeling and Forecasting Mortality Rates” (with Daniel Mitchell, Rafael Mendoza-Arriaga and Kumar Muthuraman) 47th Actuarial Research Conference, University of Manitoba, Winnipeg, Manitoba, Canada August 3, 2012


"A New Approach to Pension Risk Management" (with Jing Ai and Allen Jacobson), 9th Annual Longevity Risk and Capital Markets Solutions Symposium, Beijing, China, September 6-9, 2013, refereed.


"Understanding NFIP premiums: Or is the NFIP an insurance program or something else?" Presentation to the National Research Council committee on analysis of costs and benefits of the national flood insurance program – phase 1, National Academy of Sciences, Water Resources Board, Washington, DC, March 27, 2014, invited.

“The National Flood Insurance Program” Presentation to the National Research Council committee on risk-based methods for insurance premiums of negatively-


"Optimal Enterprise Risk Management and Decision Making with Shared and Dependent Risks" (with Jing Ai and Tianyang Wang), ” 49th Actuarial Research Conference, University of California at Santa Barbara, Santa Barbara, California July 14, 2014, refereed.

Chaired Session on Risk Modeling, 49th Actuarial Research Conference, University of California at Santa Barbara, Santa Barbara, California July 15, 2014

“PRIDIT is a Useful Technique for Detecting Consumer Fraud When No Training Sample is Available” (with , Linda Golden, John Betak, Mark Alpert, and Montserrat Guillen) Academy of Market Science World Marketing Congress, Lima, Peru August 5-10, 2014, refereed.


2015 “Risk Management as a Permeating Topic in Business Education” AACSB Teaching Effectiveness Seminar, March 4-11, 2015, Tampa, Florida

“Using DEA to Determine the Optimal Efficiency Mix of Combined Category and Brand Specific Advertising” (Linda Golden, Patrick Brockett, and Michael Kwinn, Jr) presented at the 13th Annual International Conference on Marketing held in Athens, Greece June 29-30 and July 1-2 , 2015, refereed.


2016 “The Effect of Longevity Changes and Possible Future Health State Transitions on the Optimal Level of Annuitization for Retirees” (a paper co-authored by Jing Ai, Patrick Brockett, Linda Golden and Wei Zhu), Department of Finance, University of Hawaii at Manoa, Honolulu, Hawaii April 18, 2016.


“Comparative versus non-comparative advertising effectiveness on social networking sites. A cross-cultural analysis,” (a paper written by Salvador del Barrio Garcia, Linda Golden, Patrick Brockett and Juan Miguel Alcantara Pilar), XXVIII Congreso de Marketing 20016 AEMARK, Universidad de Leon, Leon Spain September 7-9, 2016.


2017 “Measuring the Efficiency of Nonprofit Marketing, Development and Operations Resource Usage in Producing Social Benefit: An Application to the Performing Arts Sector,” (with Theresa Kirchner and Linda L. Golden),14th International Conference on Arts and Culture Management (AIMAC), Peking University, Beijing, China June 25-28, 2017

“Efficiency of Resource Usage in Arts Management/Marketing: An Application to the Symphony Orchestra Sector: an Abstract”. (with Theresa Kirchner and Linda Golden) Academy of Marketing Science 20th World Marketing Congress, Christchurch, New Zealand, June 27-July 1

“Potential Savings of Medicare: The Analysis of Medicare Advantage and Accountable Care Organizations (ACOs),” (with Charles Yang, and Linda Golden) American Risk and Insurance Association Annual Conference, August 6-9, 2017, Toronto, Canada

“Early Damage Estimation Using Archival Data and Iterative Learning from Temporally Separated Actual Loss Data” (co-authored with Rajiv Garg, Patrick Brockett, Linda Golden and Yuxini Zhang), Advances In Predictive Analytics conference, November 30,2017 University of Waterloo, Waterloo, Ontario, Canada (Invited keynote)

“Public Policy, Marketing, and the Determination of Marketplace Acceptance/Viability of Public Programs” (Invited). Academy of Marketing Science 20th World Marketing Congress, Christchurch, New Zealand, June 27-July 1 Special Session on Creating Value for Public Entities Through Marketing

“Rapid Assessment of Customer Marketplace in Disaster Settings Through Machine Learning, Geospatial Information and Social Media Text Mining” (with Rajiv Garg, Linda Golden, Yuxin Zhang), 21st World Congress, Academy of Marketing Science, Porto, Portugal June 26-29, 2018, invited

Invited discussant of the paper “To Buyout or Not to Buyout? by Yijia Lin and Tianxiang Shi, In the Longevity Risk Special Session, American Risk and Insurance Association Annual Meeting, Chicago, Illinois, August 5-8, 2018

“A Predictive Modeling Approach to Fraud Management in Medicare Claims” (with Jing Ai and Robert Lieberthal), American Risk and Insurance Association Annual Meeting August Chicago, Illinois, August 5-8, 2018

“Rapid Estimation of Disaster Relief Fund Distribution: Iterative Learning with Diverse Geospatial Data Inputs” (2018), (with Rajiv Garg, Linda Golden, Yuxin Zhang), The POMS 29th Annual Conference, Houston, Texas May 4-7, 2018

Ph.D. STUDENTS SUPERVISED

<table>
<thead>
<tr>
<th>Name</th>
<th>Dissertation Title</th>
<th>Year</th>
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<tbody>
<tr>
<td>Sun, Li</td>
<td>On Some Problems of Chance Constrained Programming</td>
<td>1990</td>
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<tr>
<td>(Co-Chair, A. Charnes)</td>
<td></td>
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<tr>
<td>Chang, Yang Chun</td>
<td>Chance Constrained Programming and Chebychev Systems with Applications</td>
<td>1990</td>
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<tr>
<td>(Co-Chair, A. Charnes)</td>
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<td>Dalle Molle, John William</td>
<td>Higher Order Spectral Analysis and the Trispectrum</td>
<td>1992</td>
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<tr>
<td>(Co-Chair, M. Hinich)</td>
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<td>Pitaktong, Utai</td>
<td>Data Envelopment Analysis and Applications</td>
<td>1993</td>
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<tr>
<td>(Co-Chair, J. Mote)</td>
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<tr>
<td>Chen, Hwei Mei</td>
<td>A Dynamic Model for Event Study Methodology: An Examination of the Reaction to California’s Proposition 103</td>
<td>1993</td>
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<tr>
<td>Zhang, Changning</td>
<td>Stochastic Programming and Optimal Salesforce Compensation Schemes</td>
<td>1994</td>
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</table>
Li, Shan

*A New Approach to Sensitivity Analysis of the DEA Models and Their Applications to Ranking and Productivity Growth*

Xia, Xiaohua

*The use of Artificial Intelligence Methods in Insurance Modeling*

Song, Yun

*Information Theoretic Approaches to Actuarial Science*

Swan, Scott

*Essays on Robust Design: An Elaboration of the Typology, An Examination of Situational Performance Implications and a Conceptual Extension*

Jang, Jaeho

*Comparative Analysis of Statistical Methods And Neural Networks for Predicting Life Insurers’ Insolvency*

Wang, Yuying

*Efficiency in the Property and Liability Insurance Industry*

Magee, David

*Neural Network Method for Actuarial Claim Reserving*

Zhou, Li

*The Navy’s Awaiting Instruction Problem*

Kang, Yu (Frank)

*Risk, Ambiguity and Insurance*

Kwinn, Michael

*Efficiency of Joint versus Service Specific Advertising for Armed Service Recruiting*

Wang, Mulong

*Financial Derivatives in Corporate Risk Management*

Deng, Honghui

*Congestion and Efficiency in the Chinese Economy*

Yang, Chuanhou (Charles)

*The Use of Weather Derivatives in Corporate Risk Management*

Ai, Jing

*Supervised and Unsupervised PRIDIT for Active Insurance Fraud Detection*
Deng, Yinglu
(Chair, R.D. MacMinn)
Longevity Risk Modeling, Securities Pricing and Other Related Issues 2011

Chuang, Shuo-Li
Stochastic Mortality Modeling and the Pricing of Mortality/Longevity Linked Derivatives 2013

Zhang, Yuxin
Currently in progress Expected 2020

MASTER'S STUDENTS SUPERVISED

Mark Leone [Mathematics/Statistics]
Candi Wolfe [Mathematics/Statistics]
John Dalle Molle [Mathematics]
Antoine Lawrence [Economics]
Kenny Kan [Accounting/Risk Management]
Mark Jones [Mathematics/Actuarial Science]
Chris Neely [Mathematics/Statistics]
Moses Kim [Mathematics/Actuarial Science]
Sandra Neto [Mathematics/Statistics]
Xinan Li [Mathematics/Statistics]
Junsheng Ma [Mathematics/Statistics]

UNIVERSITY AND COLLEGE SERVICE

Interview candidates for Assistant Professor positions in Engineering, attend their talks, and write recommendation letters, 1977-1979, 1983, 1987

Chair--CBA Ad-Hoc Committee on the Mathematics requirement, 1982

Member--Center for Statistical Studies Advisory Board, (U.T. campus-wide coordinating committee), 1983-1992

Faculty Ad-Hoc Committee to Investigate Formation of a Department of Quantitative Methods, College of Business, The University of Texas at Austin, 1984
Admissions and Registration Committee of the General Faculty, The University of Texas at Austin, (1984-1986)

Member--CBA Faculty Academic Development and Research Committee, (1985-1986)

Member--Ad-Hoc Committee to Formulate Discussion Material On Statistics in the Business School for the CBA Faculty Retreat, 1985

Recruitment of High School Football Players: Help Athletic Department by showing recruits around the Business School and answering questions, 1985

Member--Presidential Committee for the Evaluation of the Dean, 1992

Member--MBA Revision Task Committee, 1992

Member--Planning Committee for Evaluating and Developing an Employee Assistance Program for The University of Texas at Austin, 1992

Member--Advisory Committee for UT Employee Assistance Program, 1992

Faculty Senate and University Council, 1992, 1993

CBA College Retreat Member 1992

University Police Department Advisory Committee, 1993

Member--University Research Institute Grant Evaluation Committee, 1993, 1994, 1995

Member--University Committee to Evaluate Small Research Grants, 1995

Member--University Faculty Welfare Committee, 1996-98, 2002 – 2007, 2016-2018

Member Faculty Council 2004-6

Member, Rules Committee of the Faculty Council 2004

Member—Dean’s Advisory Committee 2005-2008

Member—Dean’s Endowed Professorship Selection Committee 2007- 2008

DEPARTMENTAL SERVICE

Budget Council Representative for Associate & Assistant Professors of Finance, 1982-86

Executive Committee Member, Department of Finance, 1986-1995
Actuarial Science Program Director, 1986-September 1989

Actuarial Science Advisor, Undergraduate and MBA, 1981-September 1989

Risk Management and Insurance Advisor, Undergraduate and MBA, 1989-2018

Member--Ad-Hoc Committee to Formulate Policy on Evaluating Full Professors, 1984

Member--Ph.D. Review Committee, 1984.

Chairman--Committee to Implement An Executive Committee for the Finance Department

Member—Finance Department Ph.D. Admissions Committee, 1985-1988

Actuaries Club of the Southwest Scholarship Committee

Member--Wortham Chair Scholarship Committee

Actuarial Science Program Review Committee Finance Department


Committee to Nominate Finance Department Internal Chair Candidates, 1985

Department Undergraduate Curriculum Committee (member 1985 and 1987, chair 1986)

Departmental Representative to University Human Subjects Committee

Director, Risk Management and Insurance Program, 1995-2018

Chairman, Risk Management and Insurance Scholarships 1995-2018

Member MSIS Department Budget Committee, 1995-2004

Chair, Risk Management Faculty Search Committee 1999-2001

Several Ad hoc Department Review Committees (Promotion reviews, Dean’s Fellow Recommendation Committee, Post tenure reviews, etc.) 2000-2018

MAJOR AREAS OF INTEREST

Risk Management and Insurance
Managing Financial risk
Actuarial Science
Decision Analysis
Management Science/Operations Management and Research
Statistical Analysis and Applications in Business
Information Theory
Probability Theory and Applications in Business
Stochastic Processes and Nonlinear Time Series
Mathematical Finance

COURSES TAUGHT:
- Crisis and Risk Management (Graduate)
- Risk - The Final Frontier: A History of Risk Through the Ages (Undergraduate)
- Managing Environmental Risk (MBA course)
- Managing International Risk (MBA course)
- Managing Employee Risks and Benefits (Undergraduate)
- Managing Corporate Risk (MBA course)
- Managing Property and Liability Risk (Undergraduate)
- Mathematical Risk Theory (MBA and PhD course)
- Risk Analysis and Management (MBA course)
- Mathematical Theory of Risk (PhD course)
- Introduction to Risk Management and Insurance (Undergraduate)
- Economic and Financial Aspects of Risk Management and Insurance (MBA course)
- Life and Health Insurance (Undergraduate)
- Pension Theory (Undergraduate)
- Property and Casualty Insurance (Undergraduate)
- Actuarial Science: Theory of Interest (Undergraduate)
- Actuarial Science: Single and Multiple Decrement Life Contingency Theory and Applications (Undergraduate)
- Stochastic Calculus in Finance and Business (PhD course)
- Questionnaire Analysis (Graduate)
- Mathematical Statistics (Both at Graduate and Undergraduate Levels)
- Mathematical Probability (Both Graduate and Undergraduate)
- Games, Gods and Gambling (History of the People and Ideas Responsible for the Development of Probability and Statistics) (Undergraduate)
- Information Theory (PhD course)
- Biostatistics (Graduate)
- Numerical Analysis (Undergraduate)
- Differential Equations (Undergraduate)
- Calculus (Undergraduate)
- Linear Algebra (Undergraduate)

PROFESSIONAL ACADEMIC POSITIONS

1999 - Director, Center for Risk Management and Insurance, University of Texas at Austin
1995- Director of the Risk Management and Insurance Program, University of Texas at Austin

1995- Gus S. Wortham Memorial Chairholder in Risk Management and Insurance, University of Texas at Austin

1992-2000 Janey Slaughter Briscoe Fellow, IC² Institute, The University of Texas at Austin

1998 -1999 Director, Center for Management of Operations and Logistics, University of Texas at Austin

1998 Holder of the Thomas Bowles Chair in Actuarial Science, Georgia State University, Atlanta Georgia

1996-1998 Senior Associate Director, Center for Management of Operations and Logistics, University of Texas at Austin

1992-1996 Director of the Center for Cybernetic Studies, The University of Texas

1989-1995 Joseph H. Blades Professor of Risk Management and Insurance, The University of Texas at Austin

1987-1989 Paul V. Montgomery Centennial Professor of Actuarial Science, The University of Texas at Austin

1986-1992 Senior Research Fellow, IC² Institute, The University of Texas at Austin

1986-1989 Director, Actuarial Science Program, Department of Finance, The University of Texas at Austin

1986-1989 Professor of Finance and Actuarial Science, Department of Finance, The University of Texas at Austin

1984-1986 Richard Seaver Centennial Research Fellow, IC² Institute, The University of Texas at Austin

1984-1986 Paul V. Montgomery Centennial Fellow in Actuarial Science, The University of Texas at Austin

1982-1986 Associate Professor of Finance and Actuarial Science, Department of Finance, The University of Texas at Austin

1981-1982 Assistant Professor of Finance and Actuarial Science, Department of Finance, The University of Texas at Austin

1981 Winter Quarter Instructor of Biostatistics, Department of Community and Environmental Medicine, The Medical School, University of California, Irvine Extensions

1980-1981 Visitor, Department of Statistics, University of California at Riverside, Riverside, California

1977-1980 Assistant Professor, Departments of Mathematics and General Business, The University of Texas at Austin

1975-1977 Assistant Professor, Department of Mathematics, Tulane University, New Orleans, Louisiana

1970-1973 National Science Foundation Traineeship, Department of Mathematics, University of California at Irvine, Irvine, California