

# Atmospheric Science: A Key Player in the Quantification & Mitigation of Insurance Risk

Dan Hartung (BS '07, MS '09)  
Associate Director – Catastrophe Management  
Aon Benfield – Analytics

November 10<sup>th</sup>, 2017

# Aon Benfield: An Overview

Aon Benfield, a division of Aon, is the world's leading reinsurance intermediary and full-service capital advisor—providing coverage for insurance companies against catastrophic claims and helping to grow their business.

Our colleagues empower insurers and reinsurers globally to...

- Better understand and transfer risk
- Utilize innovative data and analytics to quantify exposures
- Access customized capital across the global treaty, facultative and capital markets
- Optimize capital performance to improve operational effectiveness and achieve business growth

## Beauty in Numbers

<b>#1</b>	Reinsurance intermediary based on global annual revenues
<b>USD32bn</b>	Premium placed in the global reinsurance marketplace annually
<b>USD1trn</b>	Investment grade capital made available to clients
<b>#1</b>	Broker in every region—Americas, Asia Pacific, EMEA and UK
<b>80</b>	Offices in 50 countries
<b>100+</b>	Industry awards since 2009
<b>USD130m</b> <b>+</b>	Invested annually in analytical capabilities

## Client Promise



# Challenges Our Clients Face



How do I grow my business?



How can you help me understand the risks I bear? How can I transfer these risks and into what market:

- Traditional Markets
- Non Traditional Markets
- Capital Markets



How do I improve my balance sheet strength?



How do I maintain a competitive position and financial strength under global regulatory regimes?

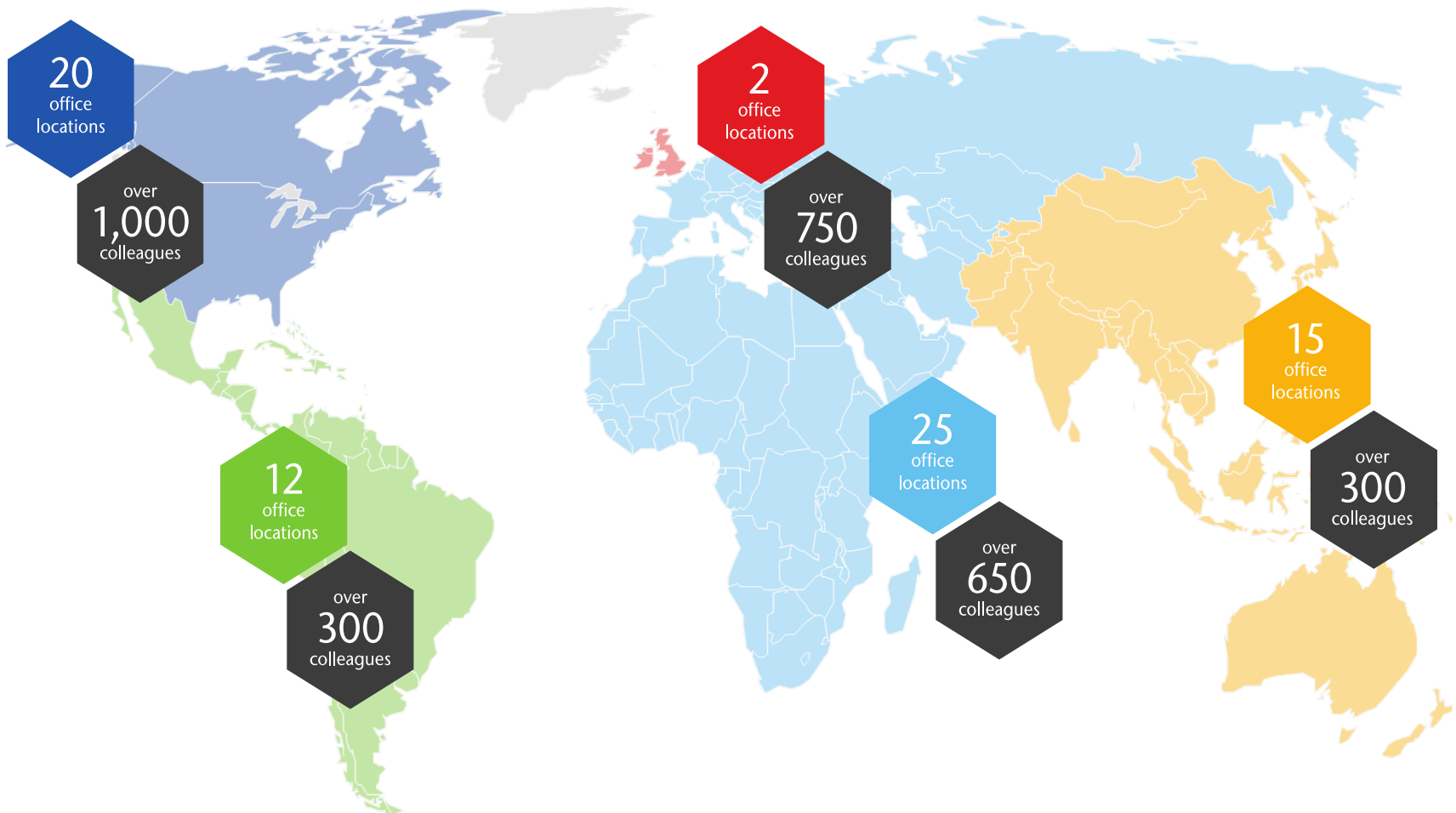


How do I increase underwriting profitability through innovation?



How do I get the best premiums?

# Global Reach And Unrivalled Access For Clients



- Aon Benfield offers global knowledge and access combined with local presence with more than 80 offices in 50 countries around the world
- We have over 3,200 colleagues globally including 500 Analytics experts

# Aon Benfield is The World's Leading Reinsurance Broker

- Aon Benfield's size and expertise, coupled with industry-leading data and insight, enables us to deliver a unique level of value to our clients not found anywhere else
- Value as our clients define it. Value that helps them achieve their goals and "empower results"

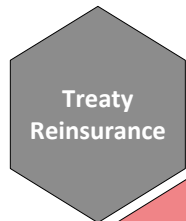
Rank	Reinsurance Broker	2013 Reinsurance Gross Revenues
1	Aon Benfield	\$1,505,000,000
2	Guy Carpenter	\$1,131,267,000
3	Willis Re	\$860,000,000
4	JLT Reinsurance Brokers Ltd	\$375,869,460
5	Cooper Gay Swett & Crawford Ltd.	\$158,466,000
6	Miller Insurance Services	\$93,528,000
7	UIB Holdings (U.K) Ltd.	\$67,463,114
8	THB Group Ltd.	\$58,094,136
9	BMS Group	\$54,300,000
10	Lockton Re	\$46,028,536

Source: Business Insurance, October 2014

Other Reinsurance Brokers: TigerRisk Partners, Holborn

# Aon Benfield's Teams and Expertise

---



Comprises professionals across all major reinsurance product groups and regional markets to ensure expertise meets specific client needs. Unrivalled placement capabilities with more than 20 specialty areas from construction and terrorism to aviation, liability and healthcare



More than 500 colleagues in 43 offices worldwide, who place USD4 billion of premium into the global reinsurance and capital markets annually



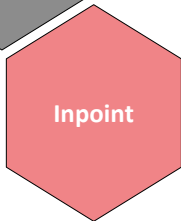
Aon Securities is consistently named the industry leader in both capital markets (catastrophe bond, contingent capital, sidecar) and financial advisory (capital-raising, new company formation, and merger and acquisition deals)



Receives USD130+ million annual investment and comprises 500 experts in specialist teams including Catastrophe Management, Actuarial, Impact Forecasting, Rating Agency Advisory, Market Analysis, Risk and Capital Strategy, Aon Benfield Research



Contract, accounting and claims services



A strategy, claims and operations consultancy dedicated to helping insurers and reinsurers improve their performance

# Aon Benfield Analytics – Practice Groups

## Catastrophe Management

In-House  
Multi-Model  
Risk  
Assessment

Risk Transfer  
Structuring

Catastrophe  
Actuarial and  
Cat Score®

Academic &  
Industry  
Collaboration

## Actuarial

Experience &  
Exposure Rating

Reinsurance as  
Capital

Reinsurance &  
Portfolio  
Optimization

Insurance Risk  
Study

## Rating Agency Advisory

Rating Agency  
Implications of  
Reinsurance

BCAR/SPCAR  
Pro Formas

Communicating  
with Rating  
Agencies

Criteria  
Changes

## Risk and Capital Strategy

Risk Tolerance  
and Risk  
Appetite

Enterprise Risk  
Management

Economic  
Capital  
Adequacy and  
Allocation

Solvency II

## Market Analysis

MarketReView®

Market News &  
Updates

Market & Group  
Profiles

Training & Short  
Courses

## Products and Solutions

Impact  
Forecasting  
Catastrophe  
Models

ImpactOn  
Demand®  
Risk  
Intelligence

ReMetrica®  
Risk and  
Capital  
Modeling

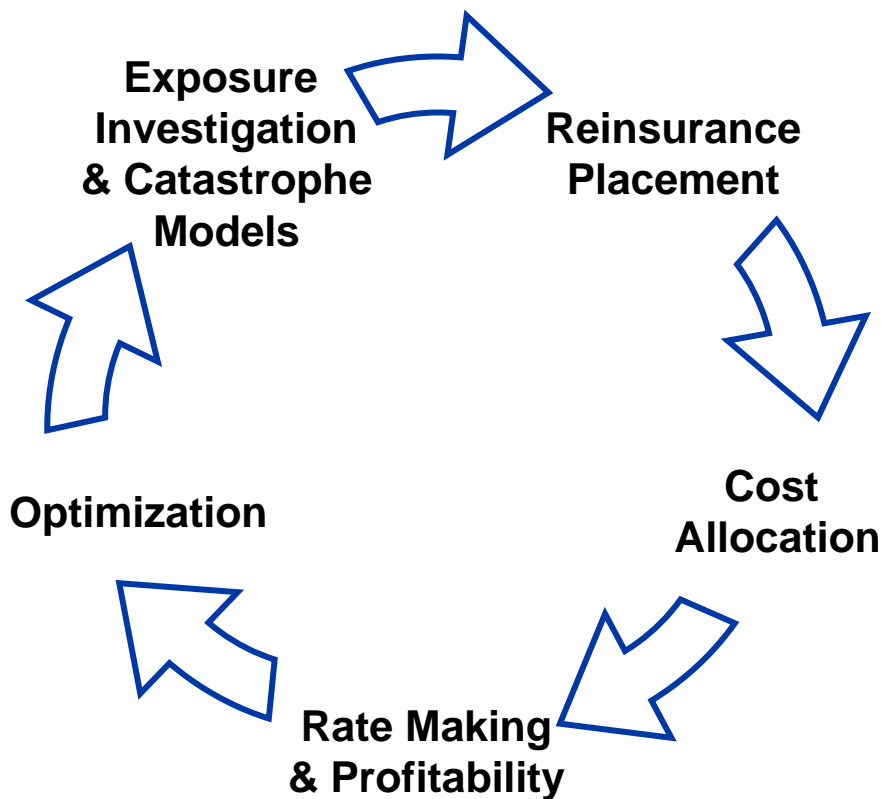
Annuity  
Solutions Group  
PathWise<sup>SM</sup>



# Catastrophe Management and Modeling



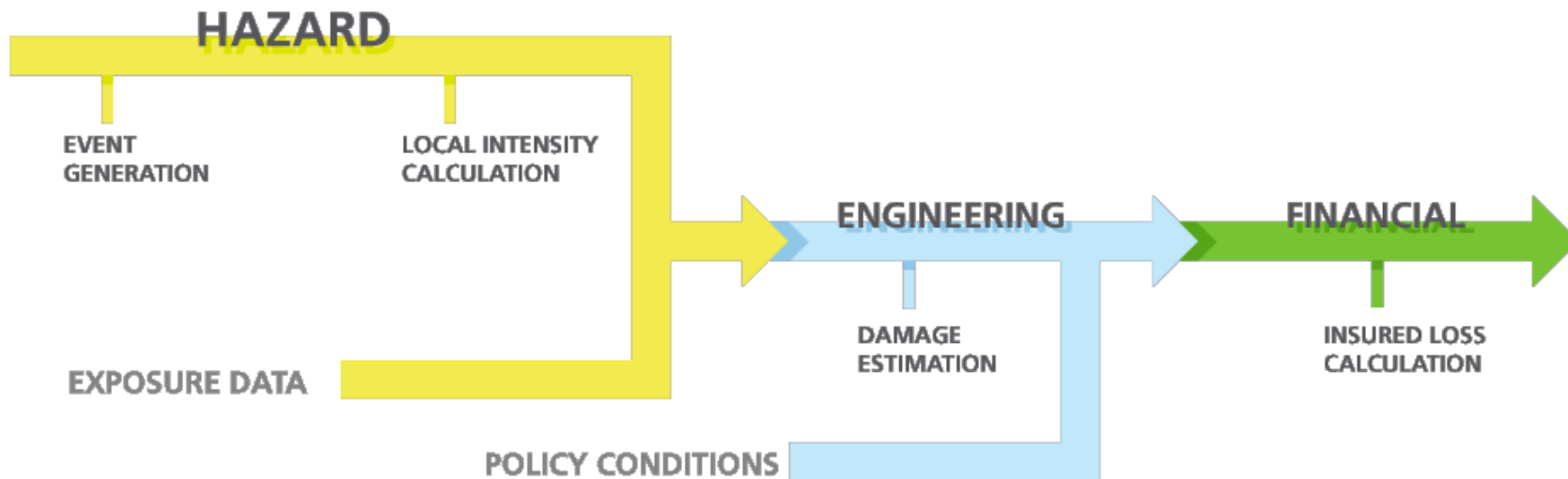
# Catastrophe Management Cycle



- Individuals typically work on several clients throughout the year depending on
  - Placement timelines
  - Expertise
  - Client resource demands
- Cycle is traditionally a yearly process but can vary based on client need
- Each portion of the cycle involves collaboration between divisions of Aon Benfield

## What is a Catastrophe Modeling?

- Catastrophic events are extreme events (low frequency; high severity) which go beyond normal occurrences and are thus unpredictable
- Catastrophe Modeling (also known as CAT modeling) is the process of using statistical models to assess the loss which **could** occur to an insurers portfolio in a catastrophic event



## The Need for Cat Modeling

- Potential for severe losses creates the necessity to prepare for such events
  - Unpredictable and infrequent nature of catastrophes
  - In cases, lack of historical information to accurately predict yearly losses
  - Increase in development within disaster prone areas
  - Catastrophic events have caused billions of insured losses bringing the importance of modeling to attention
- 
- 2005: Hurricane Katrina<sup>1</sup> - > \$76.3 billion
  - 2011: Tohoku Earthquake<sup>1</sup> - \$35.7 billion
  - 2012: Hurricane Sandy<sup>1</sup> - \$35.0 billion



1: Source: NOAA, includes insured losses from government insurers (ex: NFIP)

# What is a Catastrophe Modeler?

In a sentence...

---

Catastrophe modelers assess catastrophic risk using **computer models** to support the **placement of reinsurance** and **add value** to our clients.

## 1. Computer models

- Cat model output estimates
- Size and probability of catastrophic losses on client's exposure
- How much cat loss our client can expect in an average year

## 2. Placement of reinsurance

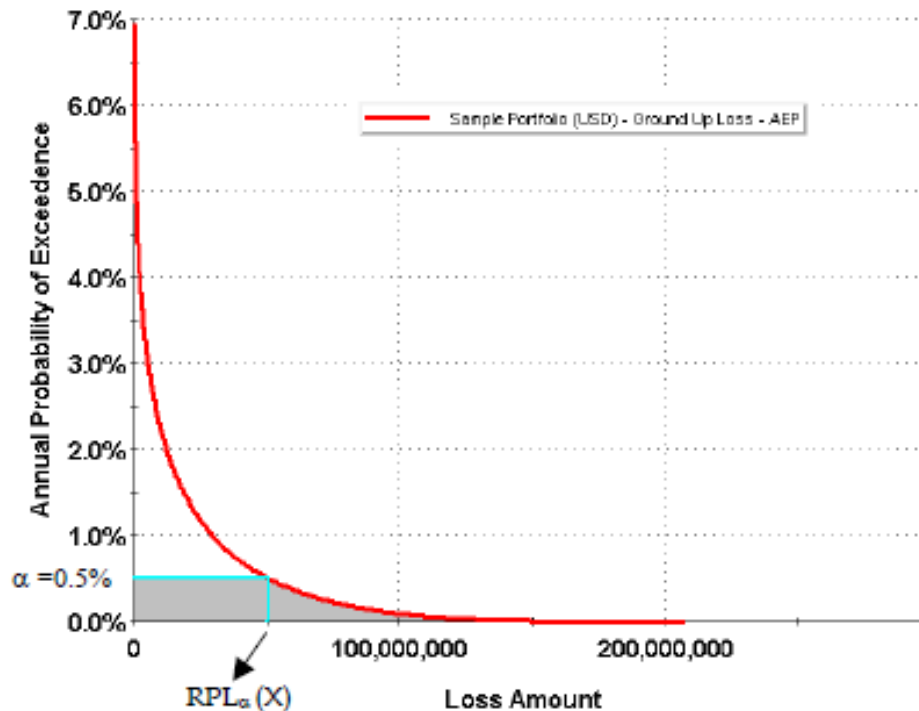
- Typically catastrophe excess of loss treaties
- Support placements with modeled data

## 3. Add Value

- Exposure management
- Portfolio optimization
- Pricing and cost recovery
- Much, much more

## Cat Model Output

- Probable Maximum Loss (**PML**): The largest economic loss likely to occur at a specified probability of occurrence.
- Average Annual Loss (**AAL**): an estimate of the annual premium need to cover losses for the modeled peril(s) over time, assuming exposure remains constant.
- Tail Value at Risk (**TVaR**): the probability-weighted average of all possible economic losses that are greater than or equal to the PML at a specified probability of occurrence
- Standard Deviation
- Frequency





## Preparing for a Career In Applied Atmospheric Sciences



# Applied AOS Career: Risk, & Insurance Industry

---

## What types of course electives should I take?

- Certificate in Business (CIB) (For Non-Business Majors - Business School)
  - 4 required classes and 2 electives to complete certificate
  - Focus 2 breadth electives on risk and insurance to enhance background knowledge and marketability
  - <https://bus.wisc.edu/degrees-programs/certificates/undergraduate/business#about>
- Risk Management and Insurance classes
- Economics, Applied Statistics, Probability classes
- Python and R programming / ARCGIS or QGIS programming
- Intro to Finance or Accounting
- Intro level Civil / Structural Engineering

## Other Important Considerations:

- Utilize College of Letters & Sciences career resources for resume building and interview practice
- 1-page resume.. Period
- Attend career fairs on campus and seek out companies you are interested in
- Private sector job interviews typically last for ½ day or longer, be prepared
- Once you land an interview, do your research beforehand and make sure you fully understand the company, the role, and have a set of questions ready to ask your interviewers

Estimate

# Certificate in Business (CIB)



UNIVERSITY OF WISCONSIN-MADISON

TOGETHER FORWARD®

PROGRAMS FACULTY & RESEARCH CENTERS & INITIATIVES

## ◀ Degrees & Programs

Undergraduate (BBA)

Full-time MBA

Evening MBA

Executive MBA

MS/MAcc

Ph.D.

Certificates

Undergraduate

Certificate in Business

Certificate in Entrepreneurship

Graduate

Capstone

Professional and Executive Development

Programs for Non-Business Majors

## Connect

Contact Us

Home > Degrees & Programs > Certificates > Undergraduate > Certificate in Business

# Certificate in Business

Share This Page



ABOUT

COURSE REQUIREMENTS

CAREERS

ADVISING

APPLY

The Certificate in Business (CIB) program provides non-business students the opportunity to earn a concentration in a clearly defined academic program in business. The coursework allows students to develop a foundational understanding of business and apply this to their specific field, such as international studies or engineering. In addition to careers related to their own fields, students who earn the certificate have also found job opportunities in management, marketing, and other business fields in the past.

## Admission

There are no specific courses that must be taken before applying. If a student chooses to take CIB courses before being admitted, the courses will fulfill requirements after admission.

In order to be eligible to apply, students must meet the following requirements:

## Meet the academic and career advisors for prospective Certificate in Business students

Katie Denzin  
Academic Advisor

Jamie Hinze  
Career Advisor

ABOUT

COURSE REQUIREMENTS

CAREERS

ADVISING

APPLY

The CIB program consists of six courses (four core courses and two additional breadth courses), for a total of 18 credits. Students are also responsible for any pre-requisite courses needed for core or breadth courses. [Click here](#) for pre-requisite information for core courses.

Students must take at least 12 of the 18 required credits in residence at UW-Madison. Study abroad courses taken through a UW-Madison sponsored program will count toward the 12 credits in residence.

### Students must earn a grade of "C" or better in all required courses for the CIB.

- Accounting 100 or 300\*, 3 crs
- Finance 300, 3 crs
- Management & Human Resources 300, 3 crs
- Marketing 300, 3 crs
- Breadth course\*\*
- Breadth course\*\*

\*CIB students are strongly encouraged to take ACCT IS 300, unless ACCT IS 100 is required by their major. Please note, however, that ACCT IS 100 is a requirement for many other upper-level Accounting and Finance courses. Students planning to take additional Accounting of Finance courses, should consult with the CIB advisor.

### \*\*CIB Breadth Requirement information:

- Breadth Courses must be at least 3 credits
- Breadth Courses must be School of Business courses (or courses cross-listed with School of Business). Breadth Courses may be from the same department as the core courses
- Breadth Courses must be from two different School of Business departments (or cross-listed with two different School of Business departments)
- Courses taken at another institution must be directly equivalent to a UW-Madison business course and title (i.e. not elective credit)

# Private Sector Opportunities

## Insurance Companies



## Catastrophe Model Vendors



## Risk Consulting / Brokers



## Weather Risk Consulting



## Reinsurance Firms



We are hiring!



Empower Results®

Catastrophe Risk Analyst Positions available in Chicago and Minneapolis starting in June 2018!

Part of Aon's Early Career Launch Program; Open to senior undergraduates completing a Bachelor's degree by June 2018



Apply Here!

Downtown Chicago Location:

<http://jobs.aon.com/aon/aon-campus-catastrophe-risk-analyst-chicago-il>

Minneapolis (Bloomington), MN Location:

<http://jobs.aon.com/aon/aon-campus-catastrophe-risk-analyst-bloomington-mn>

## Contacts

---



**Dan Hartung**

Associate Director

Aon Benfield Analytics | Catastrophe Management

(410) 547 2870

[daniel.hartung@aonbenfield.com](mailto:daniel.hartung@aonbenfield.com)