

# FIRST YEAR INFORMATION NIGHT

## STATISTICS AND ACTUARIAL SCIENCE (SAS)



UNIVERSITY OF  
**WATERLOO**

FACULTY OF  
MATHEMATICS



# Who's Presenting?

- Riley Metzger – Associate Professor Teaching Stream, Head Stat advisor, and Waterloo alumni, twice (BMath & MMath), in Statistics.
  - I teach but...
  - I am also an advisor of...
    - Statistics
    - Biostatistics
    - Data Science

# What do the SAS Department advisors do?

- Sign course (selection) override forms for all STAT and ACTSC courses (also MTHEL 131 and ENGL 378).
- Sign plan modification forms (used to declare majors/joints/minors/specializations) for all ACTSC and STAT plans.
- Answer questions about courses in ACTSC and STAT. Things like pre-req or anti-req questions, substitutions, offerings, order to complete them and so on.
- Answer questions about the programs in ACTSC and STAT, such as electives needed, average to maintain, average calculation, how to do a double major or a minor with it.
- Many, many more things!

# How do I get help from an advisor?

- First check the FAQ and Table of Questions pages on the department website.
- If you can't find your question, then you can either email the advisors at [SASUGradAdv@uwaterloo.ca](mailto:SASUGradAdv@uwaterloo.ca) or visit us (in-person or virtually) during our regular advising hours. Hours are posted on the department website.

FAQ



Tables of Questions

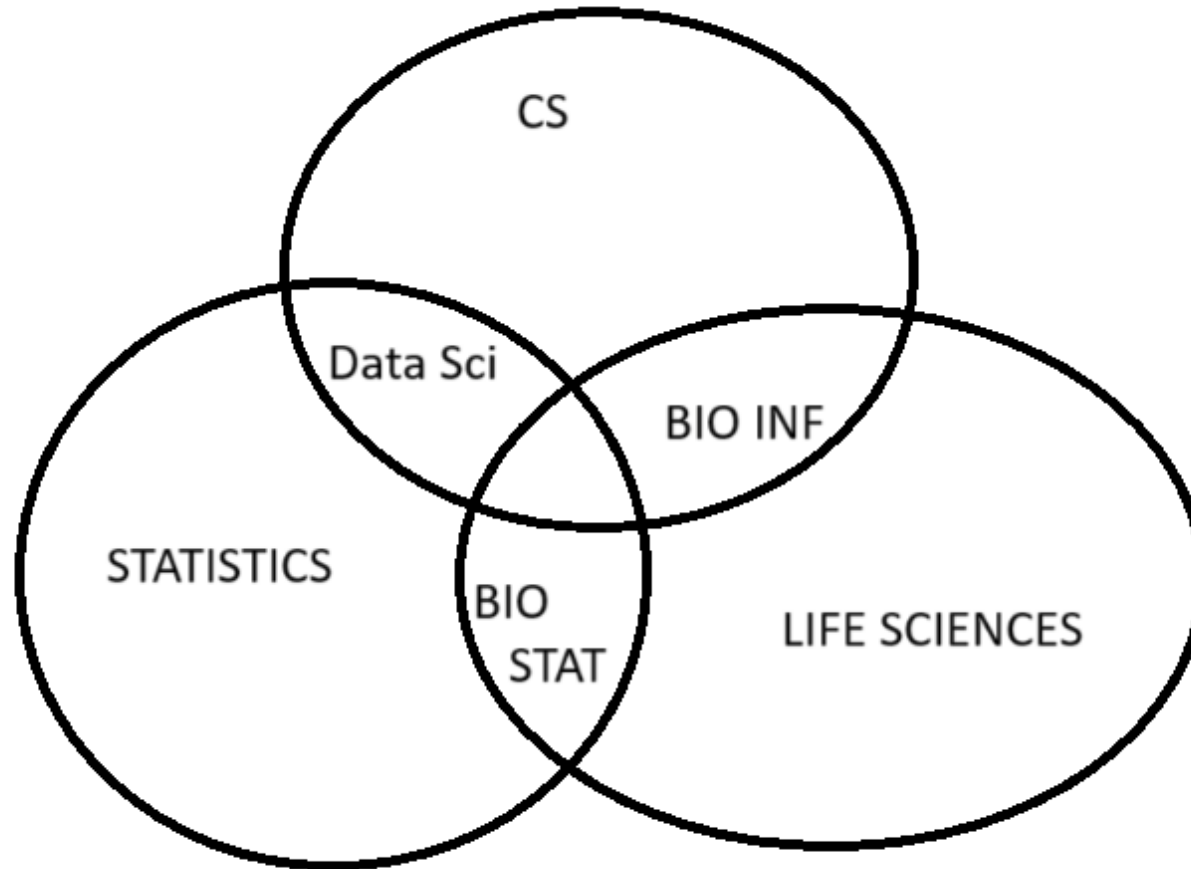


Advising hours



# **STATISTICS, BIostatISTICS AND DATA SCIENCE**

# PLAN VENN DIAGRAM



# STATISTICS

# Statistics

The field of drawing reliable conclusions from data.

Example Questions:

- How do governments and businesses come up with their conclusions about the population or the economy?
- How does a company know their marketing campaign has been successful?
- In manufacturing, what's the appropriate amount of defects to have from one machine?

# Admission requirements

All of our plans are 2A entry, i.e. you need to have passed a minimum of 10 courses.

- Statistics
  - Cumulative Average (CAV) of 60%+
    - All courses you take at UWaterloo
  - Major Average (MAV) of 65%+
    - All courses offered by the faculty of Math except COMM and MTHEL. i.e. MATH, CS, STAT, etc
  - 10+ Passed Courses
  - $\leq 4$  Fails
  - No limit to number of students

# 1A/1B Courses - STATISTICS

Fall	Winter
CS 115/135	CS 116/136
MATH 135	MATH 136
MATH 137	MATH 138
Communication List 1 Course	STAT 230 (if you have 80 or more in MATH 137) or a Non Math Elective
Non Math Elective	Non Math Elective

\*This is the standard sequence for math students. If you are having difficulties or you are excelling there are alternative sequences. Please contact a year 1 math advisor to find out more: [MathAdvisors@uwaterloo.ca](mailto:MathAdvisors@uwaterloo.ca).

# Suggested Non Math Courses

- For statistics you have a minimum of
  - 26 math courses
  - 10 non math courses (1 Communication course + ENGL 378 + 8 Other courses)
  - 4 courses that can be anything
- Non Math Course Selection:
  - Courses that will help you complete a minor in another field: Biology, Economics, Psychology, Physics etc.
  - Courses that you find interesting

# **ACTUARIAL SCIENCE + STATISTICS**

# Double Majors in Statistics and Actuarial Science

- If you complete an Actuarial Science major then to also get a Stat major you only need...

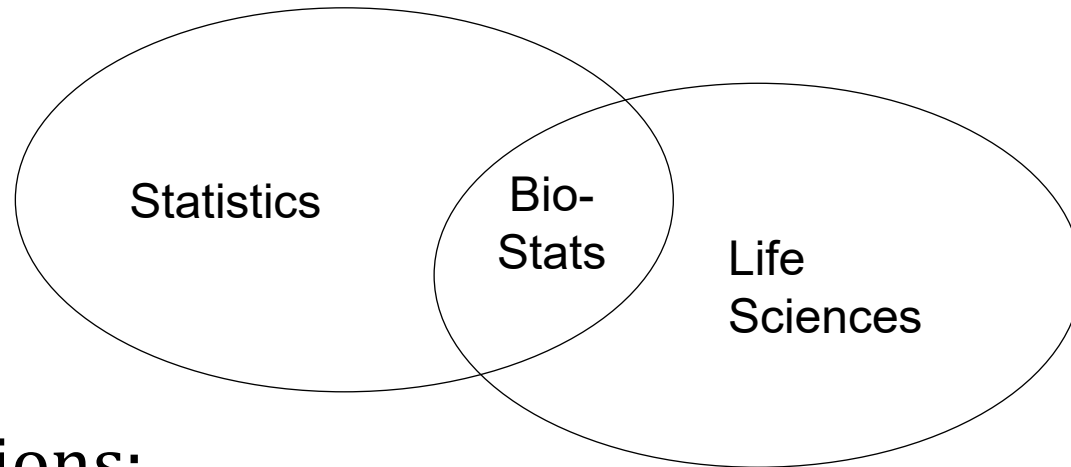
STAT 332 and a total of 3 STAT 4XX courses

(You may be able to complete a STAT 4XX or two in your Actuarial Science Major)

# **BIOSTATISTICS**

# Biostatistics

The field of drawing reliable conclusions from data in the life sciences.



## Example Questions:

- Does a particular vaccine reduce the likelihood of getting COVID?
- What affect does a government policy have on the proportion of smokers?
- What is the home range of a bear?

# Admission requirements (Same as Statistics)

All of our plans are 2A entry, i.e. you need to have passed a minimum of 10 courses.

- BIOstatistics
  - Cumulative AVerage (CAV) of 60%+
    - All courses you take at UWaterloo
  - Major AVerage (MAV) of 65%+
    - All courses offered by the faculty of Math except COMM and MTHEL. i.e. MATH, CS, STAT, etc
  - 10+ Passed Courses
  - $\leq 4$  Fails
  - No limit to number of students

# 1A/1B Courses - BIOSTATISTICS

Fall	Winter
CS 115/135	CS 116/136
MATH 135	MATH 136
MATH 137	MATH 138
Communication List 1 Course	STAT 230 (if you have 80 or more in MATH 137) or a Non Math Elective
Non Math Elective (maybe BIOL 239, HLTH 101)	Non Math Elective (maybe BIOL 239, HLTH 101)

\*This is the standard sequence for math students. If you are having difficulties or you are excelling there are alternative sequences. Please contact a year 1 math advisor to find out more: [MathAdvisors@uwaterloo.ca](mailto:MathAdvisors@uwaterloo.ca).

# Suggested Non Math Courses

- For biostatistics you have a minimum of
  - 26 math courses
  - 10 non math courses (1 Com course + ENGL 378 + one of (BIOL 239, or HLTH 101) + 7 other courses)
  - 4 courses that can be anything
- Non Math Course Selection:
  - Courses that will help you complete a minor in another field: Biology, Economics, Psychology, Physics etc.
  - Courses that you find interesting

# FLEXIBILITY

STATISTICS and to a lesser extent BIOSTATISTICS are very flexible plans.

EXAMPLE:

Part of the 26 required math courses for STATISTICS are:

4 MATH 3XX/4XX

3 MATH (any level)

These 7 courses can be in ANY field (CO, PMATH, AMATH, etc). Hence it is EASY to add a joint, minor or major to this plan.

# MAJORS, MINORS, JOINTS

In general, in terms of the number of courses a

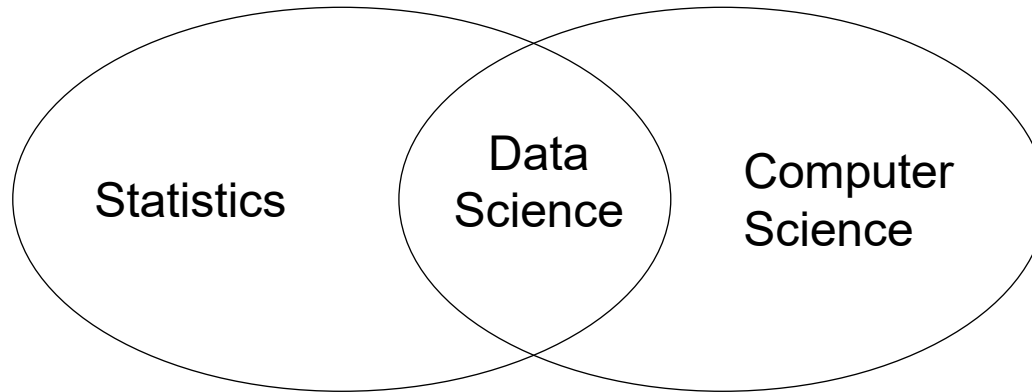
Major > Joint > Minor

The Statistics Joint and Minor are even more flexible than the major. As a result it is easy to combine these with other majors.

# DATA SCIENCE

# Data Science

The field of drawing reliable conclusions from large data sets. It studies things such as AI, and Machine Learning.



Example Questions:

**Spam filtering:** How to classify emails as spam versus legitimate

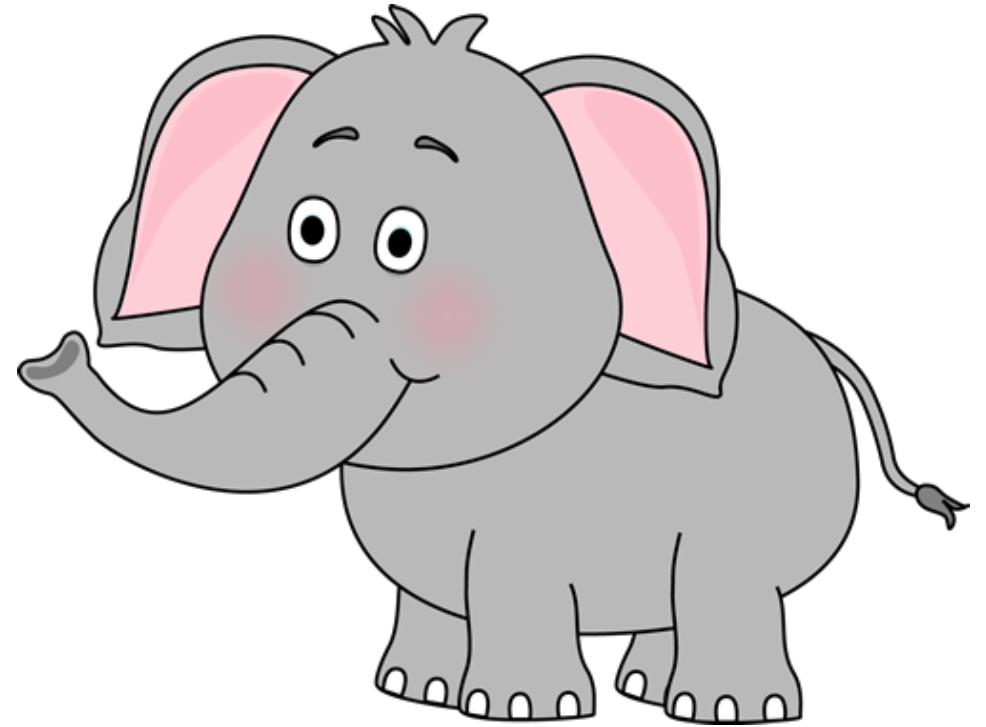
**Computer Vision:** recognize objects in images and videos

**Speech Recognition:** recognize words from an audio signal

**Conversational Agents:** learn how to respond to user queries

# Changes to BMATH DS Curriculum?

- What are the changes?
- Why the changes?
- Are the changes guaranteed? When would they take effect?
- Who do the changes affect? How does this affect you?
- Can you retain access to your CS courses?



# Admission requirements

All our plans are 2A entry, i.e. you need to have passed a minimum of 10 courses.

- Data Science
  - Cumulative AVerage (CAV) of 60%+
    - All courses you take at UWaterloo
  - Special Major AVerage (SMAV) of 65%+
    - All courses offered by the faculty of Math except COMM and MTHEL. i.e. MATH, CS, STAT, etc
  - Major AVerage (MAV) of 70%
    - CS 136 and all major CS courses such as 245, 246, 240 etc
  - 10 Passed Courses
  - $\leq 4$  Fails
- These are minimums as the plan is **COMPETITIVE**
  - 50 seats per year (roughly 16 per term)

# BMath Data Science FAQs: ADMISSION AVERAGES

- What was the latest admission averages?
  - **Each term the admission averages differ** as the plan is competitive.
  - We look at 3 averages on a minimum of 10 passed courses: CAV, MAV, SMAV
- **This past Sept** the CAV was **80+** for incoming students. We then wanted at least one of the other two averages to be 80+.

# BMath Data Science FAQs: APPLICATIONS



- Applications
  - **When do you apply?**
    - Are you currently taking **CS 136** or have you already passed it?
    - Will you **have 10 passed courses** by the end of term?
    - Are lectures currently going on?

If YES, Then you can apply by filling out our online form. It only requires your name and IDs.

# BMath Data Science FAQs: APPLICATIONS



- Applications

- **When do you learn your results?**

In the first month of the NEXT term.

This **may** be after the add period of courses.

Application Received During Lecture Period	Results Communicated to Applicants
Fall Term (End of Lecture Period: DEC 4th, 2025)	By end of Jan
Winter Term (End of Lecture Period)	By end of May
Spring Term (End of Lecture Period)	By end of Sept

# BMath Data Science FAQs: What if I am NOT ACCEPTED?

- I didn't get in, can I apply again?
  - Yes, you can apply again, however it would be wise to have an alternative plan in place.
- Alternative Plans?
  - An alternative might be a Statistics Major with a Computing Minor. Aim to take CS 431.
  - Another alternative might be computational math major with a concentration on Statistics and a computing minor.

# BMath Data Science FAQs: What if I am NOT ACCEPTED?

- Can I take less than 5 courses a term and still get into Data Science? Can I WD a course(s)?
  - Yes you can. However we will not accept you into the program until you have at least 10 passed courses.
- Can I retake courses to increase my grade?
  - Yes. However I do not recommend it. Why?
    1. Both the original course and retaken course will be on your record. Both courses go into your average with equal weighting.
    2. You are allowed at most 3 attempts at any course.
    3. You will accumulate an unusable attempt. You are allowed a maximum of 10 of these.

# 1A/1B Courses - BMath Data Science

Fall	Winter
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MATH 137	MATH 138
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Non Math Elective	Non Math Elective

\*This is the standard sequence for math students. If you are having difficulties or you are excelling there are alternative sequences. Please contact a year 1 math advisor to find out more: [MathAdvisors@uwaterloo.ca](mailto:MathAdvisors@uwaterloo.ca).

# Suggested Non Math Courses

- For data science you have a minimum of
  - 28.5 math courses
  - 10 non math courses (1 Communication course + ENGL 378 + 8 Other courses)
  - 1.5 courses that can be anything
- Non Math Course Selection:
  - Courses that will help you complete a minor in another field: Economics, Psychology, Physics etc.
  - Courses that you find interesting

# LESS FLEXIBLE

Data Science CANNOT...

- Be combined with any other math major or joint.
  - i.e. Data Science + Actuarial Science Major is NOT allowed
  - i.e. Data Science + Actuarial Science Minor is allowed.
- Be combined with Double Degree (you must take the BCS version)
- Have a minor in Statistics or CS.

# BCS DATA SCIENCE vs BMATH DATA SCIENCE

## BCS

- 2 Communication courses
- Access to all CS major courses
- Depth and Breadth requirements on non math electives

## BMATH

- 1 Communication course + ENGL 378
- Access to limited CS major courses
- NO depth and breadth requirements on non math courses, you can take what you want

# **COURSES OF INTEREST**

In Biostatistics, Data Science and Statistics

# Courses with Grade Requisites

- ENGL 378 – requires 70+% in your first communication course
- STAT 330, 333, 340, 341 – requires 60+% in STAT 230
- STAT 331, 332 – requires 60+% in STAT 231

# Main Courses in BIOSTATISTICS

STAT 337 – An introduction to Biostatistics

STAT 431, 437, 438 – Additional courses in Biostatistics.

# Main Courses in Data Science

Any course in STAT 44X (open to any Math Faculty student with the requisites)

A popular course in AI/Machine Learning is STAT 441 which requires STAT 341

## Program Overview



PRESENTATION TITLE

## Program Checklist



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## DS Application



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# **EMPLOYMENT**

In Biostatistics, Data Science and Statistics

# What kind of jobs do Statistics students get?

SAMPLE CO-OP JOBS	SAMPLE CAREERS
Compensation Data Analyst, Hay Group	Statistician, Statistics Canada
Metadata Management Consultant, Bank of Montreal	Software development analyst, IBM Canada Ltd.
Statistician, Labstat International ULC	Research biostatistician, Chedoke-McMaster Hospitals



# What kind of jobs do Biostatistics and Data Science students get?

## Biostatistics

SAMPLE CO-OP JOBS	SAMPLE CAREERS
Cancer Genome Data Analyst, Ontario Institute for Cancer Research	Bioinformatician, Peter McCallum Cancer Centre
Medical Research Assistant, London Health Sciences Centre	Biostatistician, Alberta Health Services
Research Assistant, Development Research Centre of the State Council	Senior Policy Developer, Workplace Safety and Insurance Board

## Data Science

SAMPLE CO-OP JOBS	SAMPLE CAREERS
Computer Vision Researcher, Slyce	Machine Learning Researcher/Practitioner
Data Mining Research Assistant, Simon Fraser University	Business Analyst
Data Scientist Intern, Facebook	Data Engineer



# Useful Resources



On our department website we have:

- Program sheets to help with your course planning
- Links to student opportunities: Student ActSci club (Instagram handle @uwactsciclub), Financial Analysis and Risk Management Student Association (FARMSA), Mathematics Society of UWaterloo (MathSoc), Undergraduate Student Research Awards (USRA)
- Links to various campus services, supports, and important university resources
  - AccessAbility Services, Student Success Office, Immigration Consulting, and more
  - schedule of classes, exam schedule, calendar of important dates, and more

# QUESTIONS?

Thank you for coming!



<https://uwaterloo.ca/statistics-and-actuarial-science/undergraduate-studies>

SASugradADV@uwaterloo.ca