

# CIS 350: Introduction to Software Engineering: Class Introduction

## Who am I?

Dr. Byron DeVries

Second year teaching Software Engineering at GVSU

12 Years in industry (*Smiths Aerospace, GE Aviation, Aviage/GE-AVIC*)

I have worked on:

- Requirements through Implementation and Test in:
  - Aircraft Simulation
  - Flight Management Systems (FMS)
- Avionics Cybersecurity
- Process Documentation and Definition for AS9100, CMMI

I have worked as:

- Engineer
- Technical Lead (in Systems, Software, and Verification)
- Project Manager

Most recently: Directed all verification for Boeing 737 and MAX FMS

**I am biased towards process heavy software development  
for high-assurance software.**

## Current Research Interests

### **Requirements Analysis and Code Generation for Adaptive Cyber-Physical Systems to support:**

- Automatic Repair / Mitigation
- Mode Discovery, Generation, & Safe Transition

Currently using multi-objective genetic programming to:

- Generate control code for a robot with LIDAR that:
  - Correctly transitions between controllers
  - Supports disparate requirements.
  - Operates even in unexpected or uncertain scenarios.

**If this kind of research sounds interesting to you,  
e-mail me or come see me during office hours.**

### Run-Time Monitoring of Self-Adaptive Systems to Detect N-way Feature Interactions and Their Causes

Gothenburg, Sweden



International Symposium on Software Engineering  
for Adaptive and Self-Managing Systems (SEAMS)

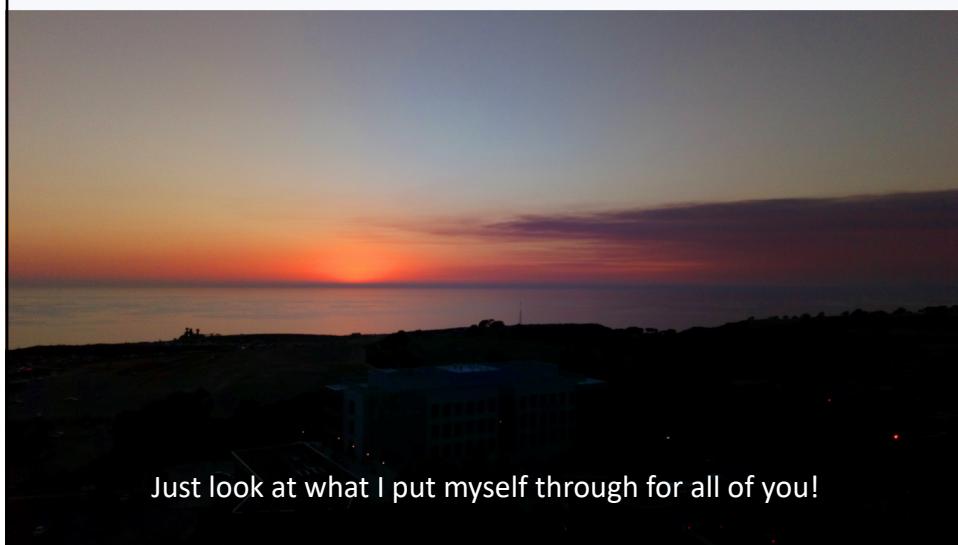
## Automatic Detection of Feature Interactions Using Symbolic Analysis and Evolutionary Computation

Lisbon, Portugal



## NSF Computer Science New Faculty Workshop

San Diego, California



Just look at what I put myself through for all of you!

4am, This Sunday (Aug 26<sup>th</sup>)



How was your summer?

What do you think "Software Engineering" is?

How do you think Software Engineering in Industry is different from your CS assignments?

- Multiple people on team making updates
- Specific platform in mind
- Geared towards a customer
- Documenting Code
- Hardware Dependent
- Much larger scale
- More user friendly
- More process
- Code Reviews
- Analysis programs for bugs
- Higher quality standard
- Comments are important
- Cost and Schedule limitations
- Non-expert customers
- MVC and other Design Patterns
- Security Importance
- Code Maintenance

## How is Software Engineering in Industry different from your CS assignments?

- Requirements are **ambiguous**
- Requirements **change** during development
- Scale is **larger** putting stress on:
  - Design, and
  - Teamwork
- Software must be **maintained** (i.e., changed) after it is delivered
- Failure is more **expensive**. Software can be:
  - Business-Critical
  - Safety-Critical

## Why is this a problem?

- Software is difficult to maintain
- Software schedule and cost estimation is difficult
- Too many software projects fail\*, including:
  - Ariane Missile,
  - Denver Airport Baggage System

\* Budget, Schedule, or Functional issues that result in cancelation of the project.

## What is software engineering?

- The study of systematic and effective processes and technologies for supporting all software lifecycle activities in order to support:
  - Improved Quality (i.e., prevent those disasters)
  - Reduced Cost

**Note: these are *competing objectives*.**

## Course Objectives

- Describe the phases, activities, advantages, and limitations of major **software development life cycle models**.
- Be able to learn and apply **requirements, analysis, and design** techniques.
- Use **UML diagrams** to specify static and dynamic aspects of software systems.
- Apply **project management** techniques and tools (such as COCOMO, Earned Value Analysis) to estimate effort, schedule, and measure project progress indicators.
- Apply black-box and white-box software **testing techniques**.
- Demonstrate an understanding of **social, legal, ethical, and global issues** in computing.
- Write a **technical report** utilizing APA formatting and citation guidelines.

**Most Importantly: Understand the *tradeoffs* between choices.**

## Syllabus

- **Course Structure**

## Course Structure

- Defining Software Engineering and Ethics
- Software Process Models
- Software Engineering Tools
- Software Requirements
- Software Project Management
- Unified Modeling Language (UML)
- Object Oriented Analysis & Design
- Design Patterns
- Test Driven Development
- Software Testing
- Software Building

## Syllabus

- Course Structure
- **Assignments**

## Course Assignments

### Previous Versions

- Class participation
- Homework
- Exams (midterm and final)
- Group Project
- Term Paper (outline and 2 revisions)

### This Version

- Class participation
- Homework
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- Class participation
- **Homework**
  - **Reading Response Assignments**
- Exams (midterm and final)
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### This Version

- Class participation
- **Homework**
  - **Reading Response Assignments**
  - **Individual Project Documents**
- Exams (midterm and final)
- Group Project

## Syllabus

- Course Structure
- Assignments
- **Office Hours**

## Office Hours

- Monday, Wednesday, Friday:
  - 2:00pm 3:00pm
  - D-2-218 MAK
- Thursday:
  - 5:00 – 6:00pm
  - 618a / 618 Conference Room EC (Downtown)
- By appointment, or just stop by D-2-218 when the door is open
- E-mail me at: [Byron\\_DeVries@gvsu.edu](mailto:Byron_DeVries@gvsu.edu)

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- Course Structure
- Assignments
- Office Hours
- **E-mail Policy**

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- **Early Review**

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- Early Review
- **No Book!**

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- Course Structure
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- Early Review
- No Book!
- **Read the Syllabus and Complete Quiz**

## Fundamental Attribution Error (FAE)

FAE states (roughly) that people:

- Judge others based on their *actions*, but
- Judge themselves based on their *intentions*.

If you promise to assume I am doing my best to:

- Grade fairly,
- Convey information understandably, and
- *Ensure your success in this class.*

Then I promise to assume you are doing your best to:

- Turn in your best effort on time,
- Attend class and participate, and
- *Ensure your success in this class.*

## For Wednesday

- Complete the Quiz on Blackboard (must have 100%)
- Document your schedule and bring to class
- Think about project ideas that interest you
- Consider signing up for Github