

CMPT 858 – Term 2, 2010-2011

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Lecture 1



CMPT 858 Focus this Term: Agent-Based Models for Public Health

- **Purpose of models**
- **Model strength & limitations**
- **Diversity of classes of models available**
- **How models are built, refined & analyzed**
- **Software & analytic tools for working with models**
- **How models mesh with traditional techniques**
 - **Linkage databases**
 - **Real-time data collection (EMA)**
 - **Biostatistics**

Class Objectives: To Help Students

- **Learn to appreciate and critique existing agent-based models**
- **Understand the proper limitations and limitations of such models**
- **Gain familiarity with modeling software**
- **Learn how to conceptualize, formulate, and analyze agent-based models (regardless of application area)**
- **Gain experience in applying such models in the public health context**
- **Understand some open areas of modeling research**

Anticipated Class Coverage

- **Motivations**
- **System science concepts**
- **Qualitative sketching of ABM**
- **Agent dynamics**
- **Inter-agent interaction**
- **Hybrid modeling**
- **Agent environments**
 - Irregular topologies (networks)
 - Regular (e.g. CA)
 - Irregular geometries
- **Debugging**
- **Best practices in model building**
- **Individual-based vs. aggregate**

Class Coverage Cont'd

- **Modeling process**
 - **Scoping**
 - **Formulation**
 - **Parameterization**
 - **Calibration**
 - **Validation & Confidence building**
 - **Model analysis tools & techniques**

Class will Be...

- **Interactive & Informal**
- **Adapted to student interests**
- **Project based**
- **Demanding**
- **Highly interdisciplinary**
 - **Aimed for accessibility to diverse audience**
 - **Some material presented in additional sessions for certain backgrounds**
 - **Required: Patience in dealing with diverse peers**

This Class is Not for Everyone

- **The class will be demanding in different ways from different people**
 - **Health Sciences:** A willingness to take on quantitative & computer challenges, and to acquire new skills and approaches
 - **Computer Science:** Patience with challenges of modeling real-world phenomena, and understanding textured health science concepts, terminology & aspects of public health practice.
- **The skills learned in the class have broad applicability, but here have a domain focus**
- **We encourage students not convinced of their desire to confront challenges to look elsewhere**

Class Diversity

- **Our class is expected to be diverse in many ways**
 - **Students/Faculty observers**
 - **Student backgrounds in CH&E/MPH/Biostats/Computer Science/Economics**
 - **Participant interests**
- **The instructor will make efforts to address diverse backgrounds & interests**
- **Please**
 - **Be respectful of those from all backgrounds**
 - **Recognize need to re-hear things you know**

Extra Resources for Students

- **Office hours**
- **Focused Tutorials**
 - **Providing extra background & context**
 - **Providing more advanced material (upon student interest)**
 - **Likely topics**
 - Health Science terminology & concepts/Data Input & Output/Programming terminology & concepts/Decision Analysis Tie-ins/Calibration approaches/Dimensionality Analysis/Analysis techniques

What is Expected of You

- **Attendance & Participation**
- **Reading papers before class**
- **2 modeling exercises**
- **Project**
 - **With instructor guidance**
 - **Interdisciplinary teams required**
- **End-of-Term Presentation**

Classroom Exercises

- **Interactive modeling exercises on laptops will be a key component of the course**
- **Contingent on student needs, we could have (pre-installed) laptops delivered to the classroom for students who need them**
 - **Please speak with the instructor if you'd like to use such a laptop**

Administrative Info

- **Office Hours: Friday 3:30-5pm (Thorv 280.6) & by appointment**
 - **Especially important b/c of diversity of backgrounds & limited time**
- **Course website at moodle.cs.usask.ca**

Project Information

- **Multi-person projects**
 - **Interdisciplinary mix is essential**
- **Project can be**
 - **Modeling application (in area for which data is readily available)**
 - **Paper review & critique**
 - **Methodological study**
- **Instructor can help facilitate**
- **Meet early with the instructor to discuss possibilities**

Resources

- **Vensim Download**
 - <http://www.vensim.com/freedownload.html>
- **Moodle: <http://moodle.cs.usask.ca>**