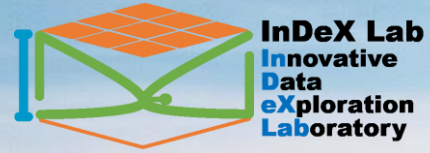


# Flames



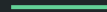
## CS 594: Responsible Data Science and Algorithmic Fairness

Abolfazl Asudeh  
Fall 2020



# Outline

1. Introduction
2. Course Syllabus, Teaching Evaluation Strategy
3. Course Topics
4. Motivation?



# Introduction

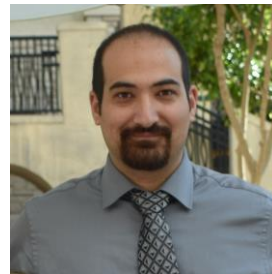
- Abol (Abolfazl) Asudeh

- Please refer me as “Abol” or “Dr. Abol”
- <https://www.cs.uic.edu/~asudeh/>
- [asudeh@uic.edu](mailto:asudeh@uic.edu)
- Skype: a.asudeh

- Joined UIC at 2019 (after a post-doc at U. Michigan)

- Research

- InDeXLab: <https://www.cs.uic.edu/~indexlab/>
- We study different aspects of Big Data and Data Science, including data management, data analytics, and data mining, for which we aim to find efficient, accurate, and scalable algorithmic solutions.
- We always look for passionate students to join the team.



# Introduction

- Your turn! ;)
  - Your name; a little bit about yourself
  - When did you start
  - Your research area/interest
  - What do you expect to learn in this course?
  - Do you already have a fairness related project? How familiar are you with the topic

# Course Syllabus

- COVID-19! → It is yet not finalized
- We are going to discuss it today

# Course Objective

- This course views data-driven and algorithmic decision making through the lens of **data ethics** and **societal impacts**.
1. It shall cover the important aspects of the timely research area of responsible data science.
  2. The course should empower the graduate students with background/tools to start exploring/conducting research in this area.

# Method of Instruction

- The first half of the class includes lectures given by **me**.
- In second half, **you** will present research papers:
  - We will discuss the papers during the class
  - Possible directions?
- Research Project (groups of size at most two):
  - Explore/Implement existing techniques
  - Improve/Target open research problems
    - Publishable? Great!
  - **Project Proposal Due: Oct. 1 2020**

# Grading

- Active Class Participation: 30%
- Presentation: 35%
- Final Project: 35% + 10% Bonus



# Course Topics

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# Data Ethics Terms

- Fairness
- Transparency
- Accountability
- Stability
- Equity
- Diversity
- ...

# A Taxonomy of Fairness Definitions

- Individual v.s. Group fairness
- Statistical v.s. Societal Norms of Fairness
- Fairness Categories
- 21 Definitions
- Intersectional Fairness
- Causal Fairness
- Diversity as Fairness
- Impossibility results
- ...

# Bias in Data

- Sources of Bias
- Types of Bias

# Fairness Interventions

- Fairness in Machine Learning Models; Fairness in Classification
- Fairness Beyond Classification: Fairness in Assignment, Human-designed models, Ranking, and Non-predictive Models
- Post-process techniques for achieving Fairness
- Data Preparation for achieving Fairness by Preprocess techniques
- In-process techniques for achieving Fairness

# Motivations

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# City of Chicago

- Redlining and its consequences; e.g. Policing