# **UW Advance Data Analytics and Informatics**

**[VIEW PROGRAM BROCHURE](https://noncredit.visp.wisc.edu/wp-content/uploads/sites/1004/2021/01/UW-Advance-Data-Analytics-Flyer-2021.pdf)**

The UW Advance virtual program provides a three-week opportunity for undergraduate students to get a glimpse into the academic programs at UW-Madison. During this time, you will

* Learn topics in Data Analytics and Informatics by experienced and well-qualified faculty and teaching staff
* Particpate in workshops applicable to any major under the theme of Data Science and its impact on society
* Engage in English courses and refine your skills and build confidence through presentations, debate, discussions, and analysis

Receive direct instruction and feedback on your English writing

* Connect with current UW-Madison Students
* Explore UW-Madison through virtual campus tours
* Interact with peers in virtual social and cultural activities

Included in the program:

* Orientation and opening ceremony
* Final project presentation
* Closing ceremony
* Certificate of participation

****Dates:****July 12-30, 2021

****Cost:**** $780

****Registration Deadline:**** June 28, 2021

**[SAMPLE SCHEDULE](https://noncredit.visp.wisc.edu/wp-content/uploads/sites/1004/2021/02/UW-Advance-Data-Analytics-Sample-Schedule.pdf)**

## **Topics**

****Information Theory and Uncertainty Quantification****

1. Shannon and Shannon’s information theory
2. Using information theory to find the least biased solutions
3. How the information theory can be applied to quantify the uncertainty in real world application.

****Extracting Key Features from Massive Data Set in Climate Science****

1. Some basic data decomposition methods using plain language
2. Some data sets for nature
3. Applications of the decomposition tools in 1. to extract the key features of monsoon and El Nino

****Data Assimilation and Prediction****

1. Main difficulties in predicting nature
2. The Bayesian data assimilation and the ensemble forecast method
3. Applications to forecast nature

Lectured by [Professor Nan Chen](https://www.math.wisc.edu/~chennan/)

****Big Data Ethics****

1. What is Ethics? Ruist Ethics and Basic to all Ethics
2. Big Data and Ethics
	* Who collects Big Data and what gets collected?
3. Could the Data Hurt You?
	* What happens to Big Data after collection?
4. Privacy, Bias and Unfairness

Lectured by [Dorothea Salo](https://ischool.wisc.edu/blog/staff/salo-dorothea/)

****Prediction Modeling****

Regression

* Linear Regression
* Logistic Regression

Classification

* Random Forest

Example with Random Forest

Lectured by Alex Binder

****Machine Learning and Data Science****

1. Machine Learning
2. Machine Learning Pipeline
3. Hinge Loss
4. Generalization
5. Good Feature Representation
6. Principal Component Analysis
7. Cross Validation

Lectured by [Professor Robert Nowak](https://nowak.ece.wisc.edu/)

****A Case Study: Building a Genomic Search Engine****

1. What is atSNP?
2. Constraints
3. Feasibility Candidates
4. Infrastructure for initial feasibility testing
5. Results of final infrastructure
6. Key Contributions

Presented by [Christopher Harrison](https://biostat.wiscweb.wisc.edu/staff/harrison-christopher/)







#### **Sample Certificate**

#### **IMG_259**

#### ****Sample Recommendation Letter****

 

“There are so many activities after classes in this program that encouraged me to be more active and take initiative instead of being silent. This helped me to know more and learn more and also make more friends!”

—QINGJIE (JENNY) YOU, STUDENT FROM UW ADVANCE BIG DATA PROGRAM