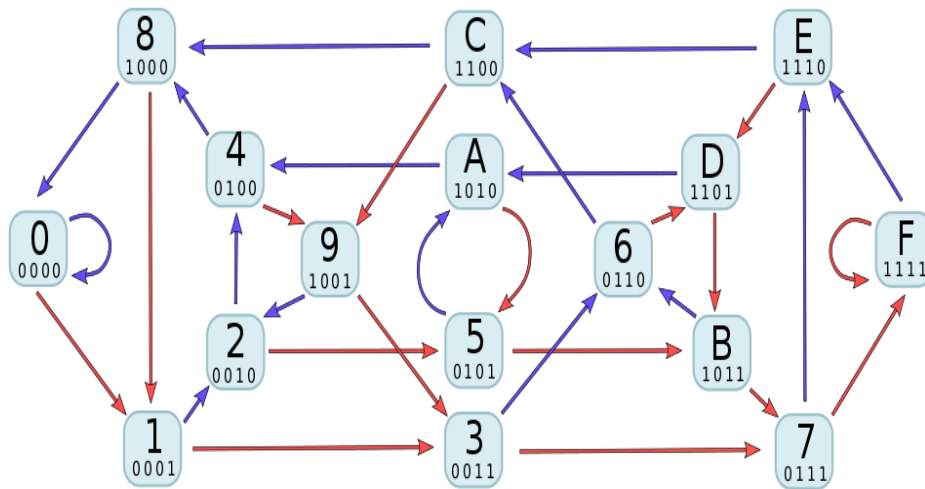




## The Henry Eldridge Department of Mathematics and Computer Science



### Polynomial Operations in Galois Field for Linear Feedback Shift Register \*

#### Abstract:

Polynomials in Galois Field with all operations in binary are of importance in several applications including the generation of pseudo-random numbers used for both cryptography and code error correction. In this presentation, the focus will be on the design of the Python library for polynomial operations needed for the development of linear feedback shift registers-based encryption. Several of the constructs implemented in the library will be tested and results presented. The presentation examines the ease of generating a pseudo-random sequence of any length.

**Keywords:** binary, pseudo-random, linear feedback shift register, a python library

\* The research is supported in part by the National Science Foundation Grant Award #CNS2000239.

### Seminar Series Fall 2022

**DATE**  
September 2, 2022

**TIME**  
11:00 am —12:00 pm

**PLACE**  
SCITEC Room 229

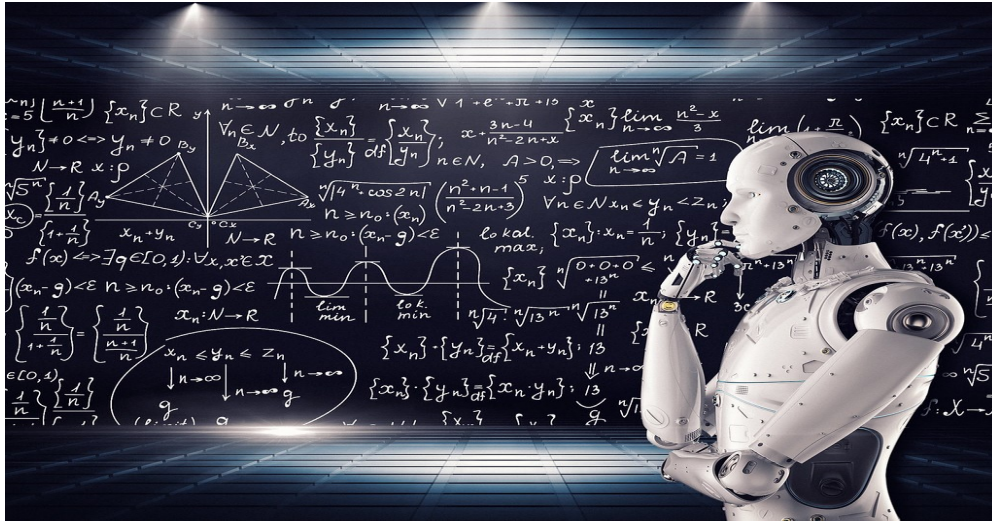
**PRESENTER**  
Dr. Daniel Okunbor, Professor  
Department of Mathematics and  
Computer Science, Fayetteville  
State University

For more information please contact:

Dr. Valentin Milanov  
SCITEC 408  
910-672-2202



## The Henry Eldridge Department of Mathematics and Computer Science



### Why do we need synthetic data for training AI?

**Abstract:** Most recent advancements in Artificial Intelligence (AI) were possible because of the successes of deep learning. In addition to requiring computational power during the training phase, deep learning needs enormous amounts of data associated with good labels. Acquiring real-world labeled data is very challenging for several reasons. Human labor is required to label the data once it has been collected. Collecting the data may also be challenging because of privacy issues and such difficulties are faced when developing applications of AI for healthcare solutions and for surveillance of humans. A possible solution is to use synthetic data which is procedurally created by computer programs to exhibit variety, environmental variability and sensor characteristics that are close to what is encountered in the real world. Since the data is generated in a simulated world, the labels are also created procedurally, and this avoids the use of human labor. Due to current efforts based on increasing demand, the quality of synthetic data is rapidly improving and the gap between simulated data and real data is decreasing in many domains. In particular certain applications of computer vision such as autonomous driving are seeing increasing use of synthetic data. This raises an important question: is synthetic data a substitute for real world data for training AI models? The answer is not yet clear but there are good reasons to take this simulation approach. At the proof-of-concept stage, training an AI model with synthetic data may be adequate especially when privacy issues are important. Synthetic data can alleviate the dataset bias problem. It can cover edge cases when acquiring real data is not practical. Domain randomization can be used to create a great diversity of data that is not possible to collect from the real world. This talk will cover these, and more topics and it will also feature current projects of the speaker.

### Seminar Series Spring 2023

DATE

April 19, 2023

TIME

9:30 am—10:30 am

ONLINE via Teams

[Join the meeting via Teams](#)

**Meeting ID: 271 472 952 727**

**Passcode: Ekou2x**

**PRESENTER**

**Dr. Sambit Bhattacharya**

**Professor Department of Mathematics and Computer Science,  
Fayetteville State University**

For more information please contact:

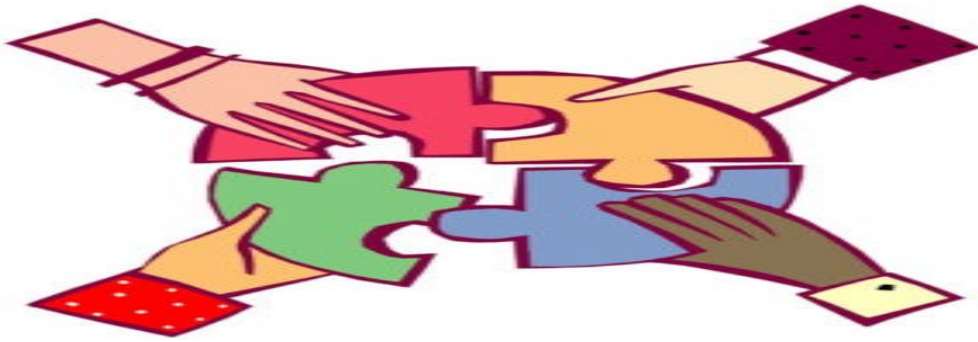
Dr. Valentin Milanov

SCITEC 408

910-672-2202



## The Henry Eldridge Department of Mathematics and Computer Science



### The Integration of Social Emotional Learning Strategies and Flipped Learning Pedagogy on Student Success and Wellness: A Pilot Study between STEAM & Social Work sponsored by S4

**Abstract:** Flip learning is an innovative and effective pedagogy educators have recognized to change traditional in classroom instruction. Flip learning flips in-class instruction with at-home instruction and practice time (Hwang, Lai, Wang, 2015). Social and emotional learning (SEL) has been defined as “*the capacity to recognize and manage emotions, solve problems effectively, and establish positive relationships with others, competencies that clearly are essential for all students*” (Zins & Elias, 2006). SEL aims to address a mix of behaviors, cognitions, and emotions. “*SEL is the process of acquiring and effectively applying the knowledge, attitudes, and skills necessary to recognize and manage emotions; developing caring and concern for others; making responsible decisions; establishing positive relationships; and handling challenging situations capably*” (Zins & Elias, 2006) The educational foundation of SEL supports academic and social-emotional development and is “*unifying concept for organizing, coordinating, and integrating school-based prevention and promotion programs that minimizes fragmentation and reduces marginalization of these efforts*” (Zins & Eluias, 2006). Merging flip and social emotional learning (SEL) allows the student to take more accountability of their learning, strengthen student faculty relationships, and create a more open and positive learning environment where the student feels seen and heard.

### Seminar Series Spring 2023

#### DATE

April 28, 2023

#### TIME

2:00 pm—3:00 pm

#### PLACE

SCITEC 229

**Join the meeting via Teams**

**Meeting ID: 271 472 952 727**

**Passcode: Ekou2x**

#### PRESENTER(S):

**Dr. Lynn Miles, Postdoc Research Associate, FSU**

**Dr. Quenton Nichols, Associate Professor in Social Work, FSU**

For more information please contact:

Dr. Valentin Milanov

SCITEC 408

910-672-2202