## **Kierra Franklin**

**Burke Award** Ph.D. Student, Biomedical Engineering First Year ARCS Scholar

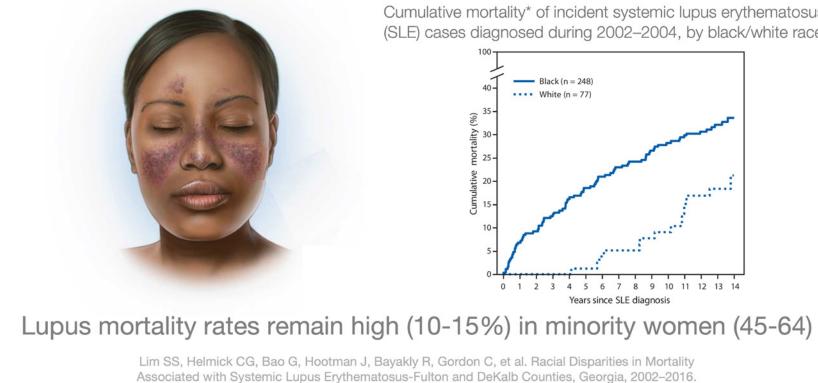
# Georgia

## **Determining the Impact of MeCP2/DNMT1** Imbalance in Epigenetic Dysregulation

By investigating key DNA methylation regulators, I will determine if their misregulation is sufficient to cause defective DNA maintenance methylation and dysfunctional helper T cells as seen in lupus.

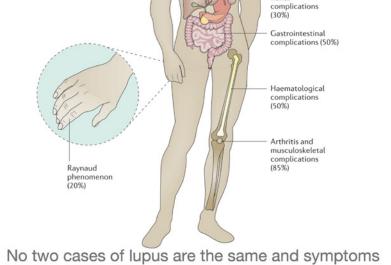
Systemic lupus erythematosus (SLE) or Lupus is a chronic auto-immune condition where the immune system attacks healthy cells and tissues ral effusio

Lupus is among the leading causes of death in young females.



Cumulative mortality\* of incident systemic lupus erythematosus (SLE) cases diagnosed during 2002-2004, by black/white race

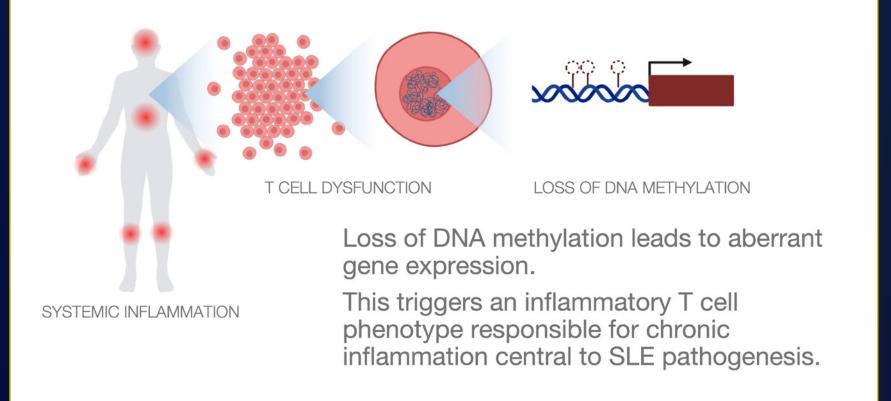
lupus is a chronic auto-immune condition where the immune system attacks healthy cells and tissues.



can range in severity, duration and onset.

Kaul A, Gordon C, Crow MK, Touma Z, Urowitz MB, Van Vollenhoven R, et al. Systemic lupus erythematosus. Nat Rev Dis Prim 2016 21

#### **Epigenetic Dysregulation leads to SLE Pathology**

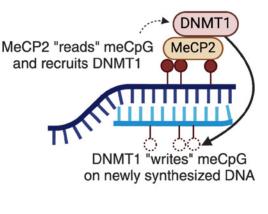


#### MeCP2 and DNMT1 Imbalance may induce loss of **DNA Methylation**

https://my.clevelandclinic.org/health/symptoms/23163-lupus-rash

In normal T cells, MeCP2 and DNMT1 maintain DNA methylation.

In Lupus T Cells, an imbalance of MeCP2 to DNMT1 may disrupt DNA methylation maintenance.



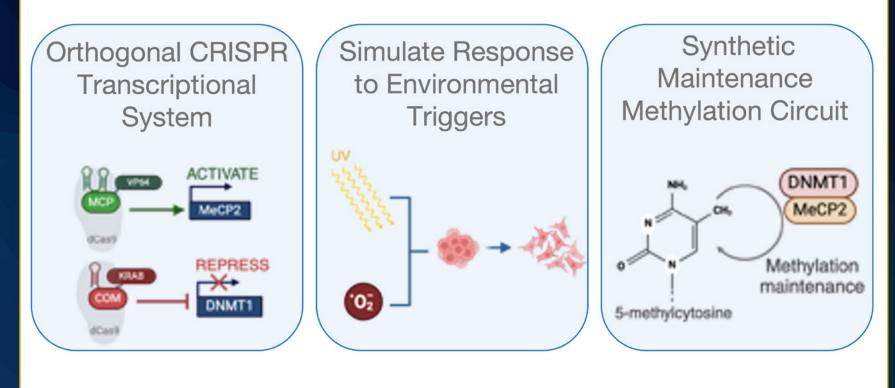
Lack of MeCP Maintenace MeCP2 MeCP2 Methylation? Loss of DNA methylation

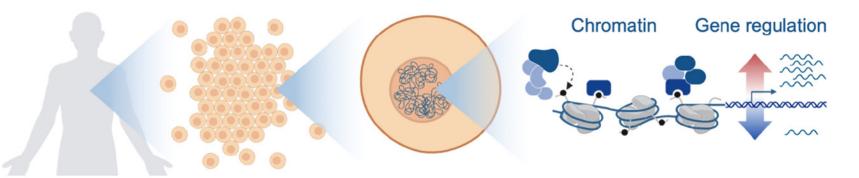
#### **Epigenetic Engineering to Understand MeCP2/DNMT1 Dysregulation in Lupus**

#### **Future Outlook**

MeCP2

DNMT1





- Establish a causal link between MeCP2/DNMT1 and T cell dysfunction in lupus.
- Reveal epigenetic events that precede lupus flare and enlighten how we view disease activity.
- Better inform drug target development and treat lupus flares.

### Scholar-Awards Celebration

November 13, 2024



Innovation in Georgia •