

# Navigating an Independent Research Career: *Professional Development Workshop*

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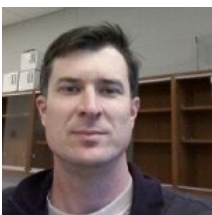
## Epidemiology and Environmental Epigenomics Lab

### Team



**Rachel Maguire**

Data management and Field epidemiology



**David Skaar**

Genomics/Epigenomics



**Dereje Jima**

Bioinformatics  
EHS Center

### Graduate students

Sarah Park (Trace metals)  
Sebnem Cevic (Alzheimer's D)

### Current NIH support

R24ES028531  
R21HD093351/R01HD079284  
R21CA227023  
R01MD011746/R01MD011746S1

### Collaborators

Alison Mostinger-Reif, PhD—Statistics  
Randy Jirtle, PhD—Molecular genetics  
Arnab Maity, PhD—Statistics  
Jung Ying Tzeng, PhD—Statistics  
Antonio Plancahrt, PhD—Molecular genetics  
John House, PhD, Toxicology/Environmental epidemiology

## Growing Up Under Apartheid...



Ian D. Smith(former Rhodesian leader)

"If blacks are to rule themselves people in towns will walk on sewage until they believe it's normal,all the gains from colonization will varnish,infrastructure will collapse,roads will be impassable, trains will kill ppl until they're abandoned as an unsafe mode of transport , hospitals will be closed ,farms will be grabed and nothing to feed the nation"

11:43 PM · Nov 1975

*'Oftentimes, just to go away is one of the most aggressive things that another person can do.....it is one of the few ways in which pressure can be put.'* John Dollard, Yale scholar study of the Jim Crow South [US]

## Education

- **Undergraduate** – Njala University, College Sierra Leone
- **Graduate school**
  - MPH-UC Berkeley, Berkeley, CA
  - PhD-UNC Chapel Hill, NC
- **Post-doctoral fellowship-**
  - UNC, Chapel Hill, NC

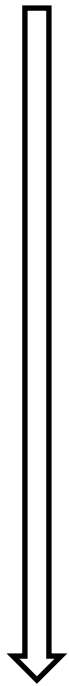
## Professional Career

- **Visiting/Research Assistant Professor** – NC Central University, Durham, NC—2000 - 2002
- **Research/Assistant Professor** – Duke University, School of Medicine, 2002 - 2009
- **Associate Professor (tenured)** - Duke University, School of Medicine, 2009 - 2013
- **Associate Professor (tenured)** – NC State University, 2014 – 2017
- **Professor** – NC State University, 2017-2020
- **Distinguished Professor** - NC State University, 2020-present

# Choosing a Research Area of Study

# Potential Link of Environment, Epigenome and Adult Disease Susceptibility Hypothesized in Humans

Peri-conception,  
Prenatal, Early  
Childhood



**Exposure**: Such as trace metals, cadmium and lead

**Record**: Molecular alteration at susceptible loci

**Propagation**: Mitotic heritability, tissue or soma-wide presence

**Retention**: Stable maintenance

**Expression**: Persistent transcriptional potential orchestrating disease susceptibility

**Transmission**: Trans-generational effects???

Adult Disease  
Phenotype

Data on the  
developmental origins  
of cancer are limited ....

Existing data support the  
developmental origins of  
some cancers. But  
longitudinal data are  
lacking.

Prenatal factors and breast cancer  
(Wu, 2006; Forman, 2005)

Intrauterine growth, overall  
birthweight linked to prostate  
cancer (Bagchi, 2005; Eriksson ,  
2007; Nilsen, 2005)

Preterm birth/low birth weight and  
esophagus and esophago-gastric  
cancers (Akre, 2006; Kaijser, 2005)



# The Newborn Epigenetics Studies (NEST): *The Goal*

## Suspected and Known Risk Factors

- Cigarette smoking
- Parental obesity
- Diet and physical activity
- Psychotropic medication
- Antibiotics/Analgesics
- Assisted reproduction
- Social stressors
- **Organic & inorganic environmental chemicals**

**EPIGENETICS??**

## Phenotypes

- Birth weight extremes
- Growth trajectories
- Childhood obesity
- Pre-hypertension
- Non-alcoholic fatty liver disease

**N>2,000 mothers and their offspring now up to 15 years of age**

# Maternal Characteristics of the NEST Cohort (n=2,548)

<b>Maternal age</b>	<b>%</b>	<b>Marital status</b>	<b>%</b>
Less than 25 years	30.8	Never married	28.6
25 to 34 years	48.4	Married	44.7
35 to 39 years	16.9	Living with partner	18.4
40+ years	3.7	Divorced/separated	8.2
<b>Ethnicity/race</b>	<b>%</b>	<b>Education</b>	<b>%</b>
African American	47.9	Less than h. school	11.7
White	45.6	H. school + college	54.2
Asian/Native/Latina	4.8	College graduate	34.2

*Rich biorepository with annotated clinical and epidemiological data for faculty and students*

*a) across NC State campus*

*b) UNC Chapel Hill, Duke, Virginia Commonwealth*

Four Nuggets to take home/think about as  
you navigate early academic career

# NUGGET 1: Choosing your mentoring team



Marilie Gammon, PhD



Randy Jirtle, PhD



Joellen Schildkraut, PhD

CURE Alumnus  
**K01-CA104517**

Developmental  
Origins and of Adult  
Disease Framework

Disparities in  
Environmental  
Exposures. Metabolic  
Disorders & Cancer

## NUGGET 2 – Iteratively clarifying your professional goals

- Guides academic choices and critical decisions
- Helps set and recognize when milestones are reached

## NUGGET 3- Navigating behavioral challenges in the workplace

- Microaggression
  - Internal to Department/Division/Institution
  - External to institution
- Academic bullying
  - External

Seek advice early before things escalate!!!

## NUGGET 4. Knowing *when* to move

- Moving can be disruptive
- Push-and-pull tension throughout career
- Average American academic researcher works at 3.5 institutions
- Head-hunters perpetually looking to move researchers

Moving academic institutions should be guided only by your career goals!!!

**Thank You,  
Questions?**