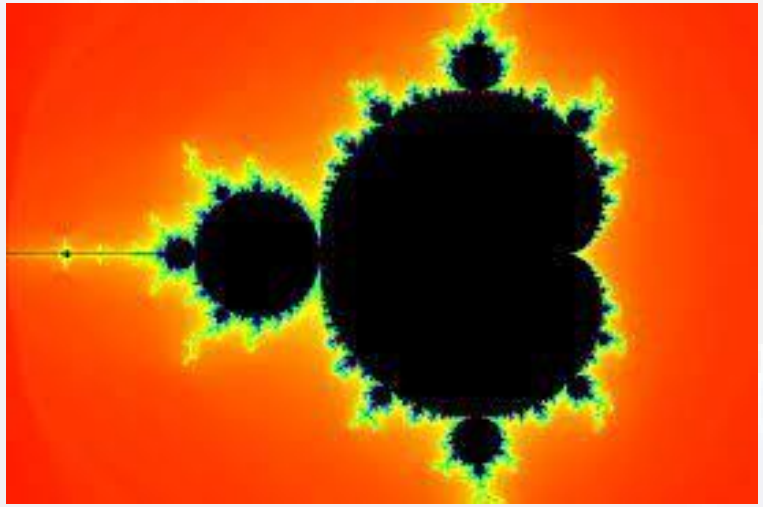
The Role of Advanced Computation, Predictive Technologies, and Big Data Analytics Related to Food and Nutrition Research

Day 2 Welcome!



Famous Quotes from Day 1:

“AI is not magic”

Anant Madabhushi

Key Considerations:

AI should be

- Interpretable
- Affordable
- Reproducible
- Equitable

Famous Quotes from Day 1:

“AI is lazy”

Key Considerations:

AI in Nutrition will be hard because nutrition data is a mess.

Be careful that your metric does not encode historical bias.

AI takes shortcuts

Judy Wawira Gichoya

Famous Quotes from Day 1:

"What do we learn that is new?"

Promises:
increased capacity to manage/analyse
big data
–omics
precision nutrition
precision public health
dietary assessment
dietary patterns
image-based methods
non image-based methods
predicting health outcomes
social media content analysis (NLP)

Challenges:
Change of culture
New vocabulary
Standardization of methods
Building capacity

Benoit Lamarche

Famous Quotes from Day 1:

"ML/AI is the driving force for data analysis in wearables."

COMPLEXITY of REAL-LIFE BEHAVIOR:

- Foods are not staged. Food items may be occluded or consumed mixed.
- Foods are eaten in all kinds of environments (car, bed, etc.)
- Foods may be consumed from shared plates (e.g., appetizers)
- Dimensional references may not be available

Ed Sazonov

Famous Quotes from Day 1:

"AI/ML have been central to the progress in microbiome analysis over the past decade."

Key Takeaways:

- Microbiome and diet are intimately linked
- Machine learning and AI methods have been critical for microbiome analysis for a decade, and many principles are applicable to other multivariate datasets
- Ethics considerations around microbiome interventions, especially around bias, stratification, and safety, also likely apply to dietary interventions
- Lots of potential for benefit from improved communication

Rob Knight

Famous Quotes from Day 1:

"Exposome research is key to informing precision nutrition through understanding how exposures, and perturbations in endogenous metabolism, are linked to our genetics, and to our states of health and wellness."

Susan McRitchie

ML models used in metabolomics:

- Principal Component Analysis
- Partial Least Squares Discriminant Analysis (PLS-DA)
- Orthogonal PLS-DA (OPLS-DA)
- O2PLS
- PLS and OPLS Regression
- Principal Component Regression
- Hierarchical Clustering
- K-Means Clustering
- Support Vector Machines
- Self-Organizing Maps
- Random Forest
- Random Survival Analysis

Famous Quotes from Day 1:

“We need a multi-disciplinary effort for training.”

Challenges for training AI with Nutrition:

- Taking courses is not enough
- Co-curricular activities
- Dual mentorship
- Appointments need to occur before qualifying exam
- Stipend (differential pay scales)
- Responsible conduct of research needs to be strengthened
- Education should include ethics, fairness, and equity in AI

Saurabh Mehta

Famous Quotes from Day 1:

“We need time and to be intentional.”

Angela Odoms-Young

Recommendations:
Outreach and Recruitment (e.g., partnering with HBCUs, HSI, tribal colleges)
Focus on Policies, Procedures, and People
Create an Inclusive Environment
Assemble Diverse Research Teams
Conduct Cultural/Structural Competence and Implicit bias Training
Identify and Remove Institutional or Systemic Barriers
Support Community Engagement
Foster Representation in Leadership
Diverse Research Topics
Evaluate Progress

Provocative points to ponder

- The nutrition research culture is to reserve 10% salary for the statistician. *What is the compensation for AI or sophisticated modeling work?*
- The nutrition research culture is to have the first author (early career) draft the paper and the senior PI be the last author. The AI lift is tremendous. How do we change the culture and how do we acknowledge the work that AI modelers do?