Promoting Science Literacy: Utilizing Food as a Tool to Teach Mathematics and Science

Presented to:

Northern Illinois University
Board of Trustees

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Academic Appointments
• Professor Northern Illinois University. 2018-Current.

Education
• PhD in Education. March 2002. Curriculum & Instruction.

Scholarship

Early Research – Pawpaw Fruit Sensory Evaluation
• Research attracted popular press
• Annual Ohio Pawpaw Festival Team Member (22nd Annual)

Later – FoodMASTER Initiative
• $3.8 M in funding • 5 workbooks • 20 publications • 100+ presentations
• Directed Special Projects for ECU’s STEM Ed Center
• Bridging the Gap NC STEM Conference Team Member (9th Annual)
The FoodMASTER Initiative is a compilation of programs aimed at utilizing food as a tool to teach mathematics and science.

Current total: $3.8 M

Research & Program Totals:
- Classrooms: 78 Grade 3-8
- Workshops: 270 Teachers
  - 58 Dietitians
- Camps: 1000 + Underserved Youth
  - 100 + Youth Leaders
- Research Mentoring: 22 Undergrad Students
  - 12 Graduate Students
- Outreach: Students & Professionals
  - Too many to count
Why is science education research important?

- According to the United States (U.S.) Department of Commerce (2017) science professions are expected to grow by almost nine percent from 2014 to 2024.

- Preparing a scientifically literate U.S. population will not only be important for empowering productive citizenship, it will also be important for meeting the increasing demand for a U.S. scientific workforce.
Why is NIU and the surrounding region an ideal location for science education research?
Science education research in surrounding communities builds a pipeline and attracts students to NIU’s science majors.
Why FoodMASTER?

- Food is relevant subject matter.
How do you teach science with food?

Middle Grades Sample Activities

Milk & Cheese

Explicit Enzymes

Directions:

1. Take one glucose strip and quickly dip it into the milk. Wait 30 seconds and compare to glucose reference chart.
2. Did it test positive for glucose?
3. Next, crush the provided lactase pill and dissolve in the milk. Again, dip a new glucose strip and wait 30 seconds. Compare to glucose reference chart.
4. Did it test positive for glucose?

Learning Objectives:

- Digestion of lactose
- Differentiate between monosaccharides and disaccharides
- Function of enzymes in digestion
- Identifying milk alternatives for lactose intolerant individuals.

What does this activity teach us about the disaccharide lactose?
FoodMASTER Research

• Increases student mathematics, science, and nutrition knowledge.

• Improves student attitudes towards science.

• Engages students.

• Increases teaching confidence and satisfaction.

• Educators are better prepared to provide students with applied mathematics and science learning opportunities.
Other Benefits

• Provides service learning and research opportunities for NIU undergraduate and graduate students.

• Supports graduate assistantships.

• Many FoodMASTER students pursue MS and PhD degrees.

Current graduate students: Jasmina Mesic and Kelly Furr. First generation college students. Both intend to pursue PhDs.
Experience Supports Interdisciplinary Doctoral Student Research

Paris Thomas
Chicago Gun Violence Research Collaborative Fellowship

My awesome colleagues →

Dr. Clay
Dr. Mazurek

Inspired by

Health disparities working group

← Alexis
Working on Small Business Research Grant
NIH SBIR

← Jerian
Just submitted doctoral Research Grant
NIH R36

My first NIU doctoral advisee

UHHS 750 – Grants Course
Enhancing NIU’s National Reputation

Deep South Network

- University of Georgia
- Athens, GA
- East Carolina University
- Greenville, NC
- University of South Carolina
- Columbia, SC
- University of Alabama at Birmingham
- Birmingham, AL
- University of Mississippi
- Oxford, MS
- Auburn University
- Auburn, AL
- Georgia Southern University
- Statesboro, GA

FoodMASTER
DEEP SOUTH NETWORK

Other Partnerships

Youth Leadership

Example
Love a Sea Turtle Foundation
NC Association for Biomedical Research
Texas Teacher Summer Institute
Phipps Conservatory and Botanical Gardens
NC State Center for Education Informatics
West Virginia University Health Sciences & Technology Academy
Nerd Clutch – Education Technology Small Business Start-up
USDA National Agricultural in the Classroom agclassroom.org

Reach to Teach

FoodMASTER: REACH TO TEACH!
Partnering Dilemmas with Science Education Communities

Deep South Network

Food
Environment
Water
NIU Regional FoodMASTER Outreach

STEM Fest

NIU P-20 Summer Teacher Institute
DuPage Co Teacher Institute Day

Plano school district
NIU P-20 Online Camp

NIU FoodMASTER Recognized

Steaming It Up Conference

West Suburban Academy of Nutrition and Dietetics

NIU FoodMASTER Recognized

Plano school district
NIU P-20 Online Camp

STEM tricks to teach your at-home cooks
NIU Research

3 Publications
Start-up and sustaining 20 years of STEM outreach research and programming: The FoodMASTER Initiative. *Journal of STEM Outreach*. 3(2)1-9. (Duffrin, et. al., 2020)
Validation of a Short Form Assessment of Attitudes in Science Constructs for Fourth Grade (AASC-4). *Journal of STEM Outreach*. 1(1)1-13. (Diaz, et. al., 2018)

6 Poster Presentations
Bridging the Gap. 2019

6 Oral Presentations
NIH Sci Ed. 2019
Bridging the Gap. 2019
Steaming It Up. 2019
West Suburban Academy of Nutrition and Dietetics. 2019

Award
1st Annual Leadership in STEM Education Award
NC Association for Biomedical Research 2018

NIU accepts $930,000 NIH grant for FoodMASTER program March 13, 2019
The Future

Permanently establish FoodMASTER as a NIU P-20 Center program and serve as an outreach component of the NIU Center for Community Sustainability.

Continue to pursue external funding opportunities with multidisciplinary teams of faculty across NIU’s campus.

Establish an Endowed FoodMASTER Professorship

*Dream Headline*

“XXXXX Endows NIU FoodMASTER Professorship”

Become recognized as a State of Illinois innovative science education program and serve as model to others.
www.foodmaster.org

Questions?
Thank you!

Hope you enjoy the day!