

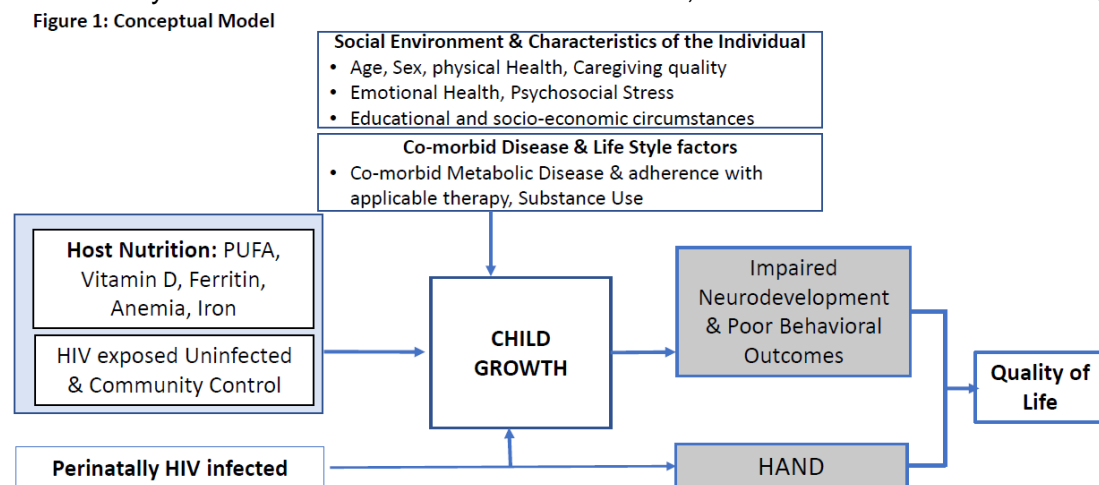
**RESEARCH PLAN: The Morbidity Contribution of Micronutrient and Polyunsaturated Fatty Acid Deficiencies to Growth faltering and Neurocognitive Disorder in Perinatally HIV-exposed and Unexposed Ugandan Children.**

**1.1 SIGNIFICANCE: HAART has positively transformed pediatric HIV but evidence of typical development is equivocal.** Increasing access to highly active antiretroviral therapy (HAART) for persons living with HIV/AIDS (PLWHA) in low and middle income countries (LMIC) has resulted in large reductions in number of perinatally HIV (PHIV) infected children,<sup>[1-4]</sup> and earlier time of HAART initiation for current PHIV compared to their pre-HAART era peers.<sup>[5]</sup> At same time, at least 1.5 million children per year are perinatally HIV exposed but uninfected (HEU).<sup>[6]</sup> Majority of HEU are exposed to HAART during highly sensitive developmental windows -including the first one thousand days of life, with poorly understood long-term consequences.<sup>[6]</sup> Perinatal HIV exposure and punctuated/chronic HAART exposure for children of female PLWHA will persist for the foreseeable future and large numbers of these HIV-affected children are expected to survive into adulthood.<sup>[1, 3]</sup> The evidence that these vulnerable children are developing/thriving in the long-term, particularly with respect to neurodevelopment and quality of life (QOL), is limited.<sup>[1, 2, 7-9]</sup>

**1.2 Impaired Growth and neurodevelopment is common in LMIC youth; HIV-infection/exposure magnifies this risk.** That all children survive and thrive with appropriate developmental outcomes is a goal of UNAIDS and several NIH centers.<sup>[10-12]</sup> Successful growth, neurocognitive development and function is a cornerstone of thriving across the lifecourse and the most important determinant of adult productivity.<sup>[1, 7, 13, 14]</sup> Unfortunately, high rates of child morbidity and mortality is typical in Uganda where an estimated 30% of children are stunted, 15.7% of children exhibit impaired or delayed cognitive development, 26.3% exhibit impaired/delayed socioemotional development and as much as 36.8% are delayed/impaired in either or both developmental dimensions.<sup>[13]</sup> Against this background of high stunting and neurodevelopmental impairment, HIV-infection and exposure represents an additional set of determinants that may act additively or synergistically with risk factors applicable to HIV unexposed uninfected (HUU) to further impair growth and neurocognitive function in HIV-exposed/infected children. HIV-associated neurocognitive disorder (HAND) - i.e. spectrum of neurocognitive dysfunction observed in PLWHA still affects between 25% to 60%.<sup>[15]</sup> HAART has successfully reduced the most severe form of HAND, i.e. HIV-associated dementia (HAD), but the prevalence

of mild and asymptomatic cognitive deficits has increased in PLWHA.<sup>[16]</sup>

The dearth of robust comparative growth and neurodevelopmental information for school-aged, adolescent and older perinatally HIV-affected relative to HUU community controls is widely recognized.<sup>[2]</sup> With few exceptions,<sup>[17-21]</sup> studies in the pre-HAART era found



diminished motor, memory, and verbal functions in PHIV compared to HIV-negative controls.<sup>[20, 22-24]</sup> The vast majority of children in these early studies were  $\leq 5$  years old. This knowledge gap is compounded by limited specific studies of the survival experience of vulnerable PHIV, HEU and HUU and partly reflects the relative recency of multi-decade survival of PHIV infected children from LMIC.<sup>[22, 25]</sup> Our team has enrolled and followed for 12 months 305 6-10 years old Ugandan children with and without perinatal HIV infection/exposure and their caregivers as part of recently completed field work. We are now enrolling another 300 Ugandan adolescents and their caregivers as part of an ongoing NIH supported R21 research program. The goal of the investigations for the AAP supported post-doctoral fellow will investigate the role of nutrition in long-term child growth and neurocognitive function as illustrated in figure 1.

**1.3 Optimal nutrition is protective and may mitigate growth faltering and neurocognitive impairment/HAND.** Substantial evidence exists for the beneficial effects of vitamins B-complex, C, and E for immunity and that sufficiency in these micronutrients alleviates high level of inflammation, improves several aspects of immune function and reduces morbidity.<sup>[26-31]</sup> Vitamin D's role in optimal growth and skeletal health is well defined.<sup>[32-35]</sup> Likewise, vitamin D sufficiency has been linked with proper immune function and a range of cardiometabolic health benefits.<sup>[36-41]</sup> In addition, an emerging body of work has linked vitamin D sufficiency to lower prevalence of a range of mental health problems including depressed mood,<sup>[42-44]</sup> anxiety,<sup>[45]</sup> atypicality and externalizing behavioral disorders.<sup>[42]</sup> More recently, vitamin D's role in brain health and neurocognitive development has been theorized.<sup>[46-48]</sup> Epidemiologic data also confirms a high prevalence of vitamin D insufficiency in broad segments of children and adults with<sup>[49-60]</sup> and without<sup>[61-65]</sup> HIV. However, there remains substantial gaps in our understanding of its relevance for cognitive function and quality of life (QOL) among children/adolescents with and without chronic HIV infection.

Polyunsaturated fatty acids (PUFA), including omega-3 and omega-6, have salutary impacts on immune function, heart health and the central nervous system through regulation of membrane fluidity, intra-cellular signaling and gene expression and down modulation of inflammatory responses.<sup>[66-71]</sup> In addition to salutary impacts on cardio-metabolic functions,<sup>[72-77]</sup> certain PUFA (e.g. arachidonic acid,) have structural roles in the brain and combine with the docosahexaenoic acid (an omega-3 PUFA) as essential co-factors for normal brain development and function.<sup>[70]</sup> Optimal intakes of omega-3 PUFAs are essential for optimal visual, neural, and behavioral development among infants<sup>[78]</sup>. Beyond infancy, optimal omega-3 PUFA intake has been associated with improvements in attention, learning, and behavioral disorders throughout the lifecourse.<sup>[79-89]</sup>

High or low ferritin - a biomarker of bio-available iron<sup>[90]</sup> - anemia and other facets of impaired hematologic status (IHS) are common and often persistent in African children/adolescents<sup>[91-94]</sup> and in PLWHA in spite of HAART treatment.<sup>[95-100]</sup> The dynamic interactions between HIV and iron create a positive feedback loop that increases the risk of iron overload, onset and persistence of non-iron deficiency anemia and may partly mediate HIV persistence and rebound.<sup>[90, 99, 101]</sup> Persistent immune activation typical in HIV infection contributes to anemia of chronic disease.<sup>[102]</sup> Anemia, regardless of etiology, predicts sub-optimal immune recovery<sup>[103]</sup> and mortality<sup>[104]</sup> in persons living with HIV/AIDS. High serum ferritin has been associated with sub-optimal immune recovery and mortality in PLWHA<sup>[101, 102, 105, 106]</sup> and represents anemia of chronic disease typified by limited bio-availability of iron. Low serum ferritin on the other hand results from impaired gastrointestinal nutrient absorption and is associated with folate deficiency, iron deficiency anemia<sup>[104, 107-109]</sup>, fatigue and depressed mood.<sup>[110]</sup> Hence low ferritin, regardless of HIV status, is expected to impair QOL and cognitive performance. Understanding the possible roles of IHS could be an important strategy for slowing HIV disease progression<sup>[111]</sup> and improving functional outcomes in nutritionally depleted children and adolescents.

**2.0 Specific Research Project:** We will work with postdoctoral fellow to quantify the modifiable role of key nutritional variables on sub-optimal long-term growth and impaired neurodevelopment/HAND in this vulnerable population. In this cohort (n=500 caregiver child pairs enrolled to date), HIV-infection/exposure presents a heightened risk of both growth faltering and impaired neurocognitive development as noted in conceptual Model (Figure 1).<sup>[14, 46, 112-115]</sup> These risk factors which may act in additive or synergistic manner to impair growth and neurocognitive development, in addition to the interplay of other environmental, demographic, medical, and lifestyle factors.<sup>[116, 117]</sup>

- **Specific Aim #1:** To quantify PUFA, vitamin D and vitamin B-12 related differences in growth trajectory over 12 months in Ugandan children 6 – 10 years old.
- **Specific Aim #2:** To determine PUFA, Vitamin D and vitamin B-12 related differences in change in neurocognitive function and neurocognitive disorders over 12 months in Ugandan children 6-10 years.

**Table 1: Nutritional Indices vary substantially by perinatal HIV status among early School-aged Ugandan children with and without Perinatal HIV infection/exposure**

Nutrient	PHIV	HEU	HUU	P-value
	Mean (SD)	Mean (SD)	Mean (SD)	
Vitamin D (ng/mL)	21.75 (6.7)	21.24 (9.1)	20.48 (7.40)	0.504
Total n3	2.97 (1.29)	2.80 (1.06)	2.92 (1.21)	0.635
Omega-3 Index	3.38 (1.58)	3.15 (1.23)	3.29 (1.49)	0.600
Total HUFA	16.10 (3.36)	14.40 (2.94)	14.82 (2.85)	0.001
T/T ratio	0.009 (0.01)	0.007(0.00)	0.007 (0.00)	0.003
Palmitelaidic acid	0.08 (0.05)	0.07 (0.04)	0.07 (0.04)	0.080
Stearic acid	11.82 (2.07)	10.42 (1.99)	10.72 (2.05)	<0.001
Linoleic acid	35.40 (5.42)	37.74 (5.08)	37.13 (5.34)	0.014
Linoelaidic acid	0.010 (0.01)	0.005 (0.01)	0.01 (0.01)	0.026
GLA	0.07 (0.06)	0.05 (0.04)	0.06 (0.05)	0.029
Arachidic acid	0.22 (0.06)	0.18 (0.07)	0.19 (0.07)	0.011
DGLA	0.73 (0.28)	0.45 (0.19)	0.49 (0.18)	<0.001
Mead acid	0.11 (0.07)	0.07 (0.04)	0.07 (0.04)	<0.001
Arachidonic acid	12.50 (2.40)	11.31 (2.23)	11.57 (2.09)	0.002
Nervonic acid	0.75 (0.24)	0.80 (0.25)	0.85 (0.25)	0.020

PHIV = Perinatally HIV infected, HEU = Perinatally HIV Exposed Uninfected. HUU = HIV unexposed Uninfected. GLA = gamma linolenic acid. HUFA = highly unsaturated fatty acid. DGLA = Dihomo-γ-linolenic acid. T/T ratio = triene/tetraene ratio

**Nutritional Biomarkers.** Serum assessments of hemoglobin, vitamin-D, ferritin and PUFA is made at baseline using standard methodology for each. In brief, hemoglobin is measured as part of complete blood count and used to define anemia per WHO age-sex thresholds as follows: <11.5 g/dl if ≤11 years, <12 g/dl if male or female 12 – 14 years or non-pregnant female aged >15 years and >13.0 g/dl if male ≥15 years old.<sup>[118]</sup> Vitamin-D will be measured as 25-hydroxyvitaminD [25(OH)D] by high performance liquid chromatography tandem mass spectrometry.<sup>[119]</sup> Categories based on the concentration (in nmol/L) of 25(OH)D are defined as follows: highly sufficient [>70], sufficient [50–70], insufficient (25–50) and deficient [≤25]. These may be collapsed based on distribution to create sufficient, insufficient vs low 25(OH)D level.<sup>[120]</sup> Serum ferritin will be measured using enzyme-linked immunosorbent assays (ELISA).<sup>[121, 122]</sup> Per prior precedent, low ferritin was defined as <30ng/L.<sup>[121]</sup> High ferritin was defined as >200 ng/L for males and >150 ng/L for females.<sup>[121]</sup> PUFA levels will be measured in serum using gas chromatography as in our previous studies<sup>[123, 124]</sup>.

**Outcome Measures:** We have two main outcome measures for this study – growth, neurocognitive function and quality of life (QOL). Growth measures include: height for age, weight for age and body-mass-index for age. Cognitive measures include: executive function and socio-emotional adjustment measured using the behaviour rated inventory of executive function and behaviour assessment system for children. QOL is measured using the Pediatric Quality of Life Inventory (PedsQL) questionnaire. All outcomes are multi-dimensionally assessed in both caregivers and children. Locally relevant relative measures in Ugandan children/adolescents will be derived by internally standardizing raw scores for each respondent to derive a z-score. Z-scores correspond to the deviation in respondents score above or below the mean score for adolescents of same age and sex specific in the sample as follows:  $X_i = (X_{raw} - X_{(sample\ age, sex\ mean)}) / SD_{(age, sex)}$ . Scores warranting clinical vigilance are defined as scores ≥1.5 standard deviations in the direction of risk relative sample age/sex mean score per principles firmly established in prior work<sup>[125]</sup> and applied in context of our cognition studies in Ugandan children/adolescents.<sup>[8]</sup>

### 3.0 STATEMENT BY MENTORING TEAM AND ENVISIONED MENTORING PLAN

To provide trainee with scientific and logistic tools needed to move forward in this exciting area of research, this team has assembled a mentoring team that includes myself-Dr. Jenifer Fenton as primary mentor, Dr. Amara Ezeamama as MSU co-mentor, Dr. Ezekiel Mupere as and Dr. Sarah Zalwango as Ugandan co-mentors. Each contributor's expertise and how they articulate with and complement each other in mentoring the AAP post-doctoral fellow is further described in mentoring plan.

**3.1 MSU MENTORING TEAM:** Jenifer Fenton, PhD, MPH (Primary), Amara E. Ezeamama, PhD (co-mentor); Trainee will gain proficiency in the following competencies from her/his interaction with the MSU based mentoring team over 12 months: 1) systematic evaluation of macro and micronutrient status in children, 2) ethical and scientifically sound methods of establishing and maintaining a research cohort, 3) strategies for enrolling, and tracking large amounts of data from the study participants with the least amount of disruption to both participants and the study enrollment site, 4) reliable assessment of neurocognitive measures via direct and proxy reports, 5) methods of systematically evaluating the quality of caregivers and environmental quality for child rearing which may confound or modify the primary relationships of interest and 6) mentoring on manuscript development and grant strategy to ensure support for future work that will emerge naturally from the activities begun as part of this fellowship.

**3.2 MAKERERE UNIVERSITY TEAM:** Ezekiel Mupere, MBChB, PhD; Sarah Zalwango, MS, MBBS

*Respectively Senior Lecturer and Chair, Department of Pediatrics, Makerere University School of Medicine, Kampala, Uganda & Director of Medical Services, Directorate of Public Health and Environment, Kampala City Council Authority.* Dr. Mupere is a pediatric infectious disease specialist and current Department Head/Chair in the Department of Pediatrics, Makerere School of Medicine. Dr. Zalwango brings expertise as a physician with specialization in Pediatrics and expertise in the implementation of clinical epidemiologic studies of HIV, TB and childhood diseases. She is the local principal investigator leading enrolment and recruitment efforts for the study cohort. She has more than ten years of experience in epidemiologic studies of TB/HIV in Kampala, Uganda. Drs Mupere and Zalwango will contribute expertise in clinical management of pediatric HIV/AIDS and will mentor trainee on identifying, measuring and interpreting metabolic complications expected to influence neurologic development, psychosocial adjustment and quality of life in this vulnerable population.

### MENTORING PLAN

Proficiency Area	Mentors Involved	Format	Frequency	Duration
Biomarker and Anthropometric methods for assessing growth and nutritional quality	Fenton, Ezeamama	Face to face meetings, e-mail or teleconferences, and response to trainee initiated inquiries	As needed (PRN) and in the context of conference calls to discuss research progress.	PRN
Analysis and interpretation of functional deficits & detangling confounding effects of functional measures by HAART, coincident micronutrient deficits and HIV	Fenton, Ezeamama	Face to face meetings while in the field, e-mail or teleconferences, and response to trainee initiated inquiries	PRN	As needed with multiple weekly interactions
Ethical Conduct of Human Subjects Research	Fenton, Mupere, Ezeamama, Zalwango	Face to face meetings while in the field, e-mail or teleconferences, and response to trainee initiated inquiries	PRN and via weekly conference calls to discuss research progress particularly in early phases of study	~1-2 hours per week particularly in early study phase
Implementation of epidemiologic study in resource constrained setting	Fenton, Ezeamama, Zalwango, Mupere	Face to face meetings while in the field, e-mail or teleconferences, and response to trainee initiated inquiries	PRN and in the context of weekly/bi-weekly conference calls to discuss research progress	~2 – 3 hrs per week
Grant writing and manuscript preparation	Fenton, Ezeamama, Mupere	Face to face meetings, PRN research meetings and e-mails	PRN	~15-20 hours per week
Managing and balancing the demands of conducting high impact science, service and teaching in an academic research career track	Fenton, Ezeamama, Mupere	Experiential learning and response to trainee initiated specific queries	PRN and weekly via designated research meeting time in the Fenton or Ezeamama research group.	~1 hour per month
Research Dissemination through conferences and Networking with other investigators	Fenton, Ezeamama, Mupere, Zalwango	Telephone, e-mails and face to face meetings	PRN and monthly in the context of designated study progress report meetings	~1 – 2 hours per month

**DELIVERABLES OVER 1 YEAR OF SUPPORT:** 2 peer-reviewed publications (submitted) and developed research proposal in mutually agreed research direction by July 2020. **Strength of Mentoring Team & Team's Ideal Position to Mentor Future Leaders in African Research and Practice:** This team has a strong track record in Uganda resulting in solid infrastructure that provides us access to relevant study populations and already collected data to support the post-doctoral trainee. In addition, the team has demonstrated experience evaluating the role of nutritional indices in HIV-related outcomes. Lastly, the investigator team has solid history of productively mentoring students in the implementation of cutting edge nutritional and epidemiologic research and are ideally situated to facilitate the training of the AAP trainee as part of this fellowship program.

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110. Al-Jafar HA. **HWA: Hypoferritinemia without anemia a hidden hematology disorder.** *J Family Med Prim Care* 2017; 6(1):69-72.
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112. Black MM. **Effects of vitamin B12 and folate deficiency on brain development in children.** *Food and nutrition bulletin* 2008; 29(2 Suppl):S126-131.
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114. Galler JR, Koethe JR, Yolken RH. **Neurodevelopment: The Impact of Nutrition and Inflammation During Adolescence in Low-Resource Settings.** *Pediatrics* 2017; 139(Suppl 1):S72-S84.



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123. Kabagambe EK, Baylin A, Allan DA, Siles X, Spiegelman D, Campos H. **Application of the Method of Triads to Evaluate the Performance of Food Frequency Questionnaires and Biomarkers as Indicators of Long-term Dietary Intake.** *Am J Epidemiol* 2001; 154(12):1126-1135.
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**CURRICULUM VITAE**  
**Jenifer Imig Fenton, PhD, MPH MS**  
[https://www.canr.msu.edu/people/jenifer\\_fenton](https://www.canr.msu.edu/people/jenifer_fenton)

**Current Position: Associate Professor**

Dept. of Food Science and Human Nutrition  
Joint Appointment College of Osteopathic Medicine  
469 Wilson Rd, 208B Trout Food Science Building  
Michigan State University  
East Lansing, MI 48823  
Phone: (517)-353-3342 Fax: (517)-355-8936

**EDUCATION:**

2001 - 2003

University of Michigan,  
Ann Arbor, MI

M.P.H. (Epidemiology). **Thesis Advisor:** MaryFran Sowers, Ph.D.

**Thesis:** *Relationship between biomarkers of inflammation and obesity: NHANES analysis.*

1995 - 1999

Michigan State University East  
Lansing, MI

Ph.D. (Nutrition and Physiology). **Dissertation Advisor:** Michael Orth, Ph.D.

**Thesis:** *Role of Glucosamine in the prevention of osteoarthritis in horses.*

1993 - 1995

University of Missouri,  
Columbia, MO

M.S. (Reproductive Physiology). **Thesis Advisor:** Duane Keisler, Ph.D.

**Thesis:** *Role of ovine interferon tau in pregnancy in sheep.*

1989- 1993

University of Missouri,  
Columbia, MO

B.S. (Animal Science). Minor in Biology. Research Project: Identified apoptosis in bovine follicles at different stages of follicular growth.

**POSTDOCTORAL TRAINING:**

2002 – 2002

Department of Food Science and Human Nutrition, Michigan State University  
East Lansing, MI.

Postdoctoral Training. **Advisor:** Norman G Hord, PhD, MPH, RD  
**Research Focus:** The role of nutrition in colon cancer prevention.

2003 – 2007

Cancer Prevention Fellowship Program,  
National Cancer Institute.  
Bethesda, MD

Postdoctoral Training. **Advisor:** Stephen Hursting, PhD, MPH.  
Research Focus: The role of obesity and inflammation in colon cancer prevention.

**ACADEMIC POSITIONS:**

*Associate Professor:* Michigan State University. 2014-current

*Assistant Professor:* Michigan State University. 2008-2014

*Visiting Assistant Professor:* Michigan State University. 2004-2007

*Postdoctoral Research Associate.* Nutritional modulation of migration in non-tumorigenic colon epithelial cells. Cancer prevention through nutrition. 2000-2002

*Doctoral Student (Research Assistantship).* The effect of glucosamine on articular cartilage degradation *in vitro* induced using either lipopolysaccharide or interleukin-1. Evaluation of extracellular matrix degradation using biochemical assays. 1995-1999.

*Masters Student (Research Assistantship)*. Determined the effect of recombinant ovine interferon-tau on pregnancy rate in the ewe. Neuropeptide Y and feed restriction in sheep. 1993-1995.

## **PROFESSIONAL HONORS:**

MSU Honors College Award for Distinguished Contributions to Honors Students 2018.

Paul Roberts Award for Distinguished Service in Study Abroad Programs MSU CANR Award. 4-2017.

Invited Presentation: Integrating Experiential Learning into the CANR Curriculum. Nutritional Sciences Example. 3-2-2017.

Presenter and Panelist: Learn at Lunch: Academic Freedom vs. Ideology in the Classroom. 2-2107.

Annual Lecture Ruth Pike Award in Nutrition at The Pennsylvania State University. March, 2016.

Invited Presentation: Learning Outcomes and Assessment in CANR Workshop:

Nutritional Sciences Curriculum Example. Michigan State University. November 9th, 2015. CANR College Curriculum Committee Meetings.

Session Chair. Diet and Cancer mini symposium. Experimental Biology Annual ASN Meeting. 2015. Boston, MA. Diet and Cancer; Fat versus Fiber in colon cancer: opposite

in the end.

External PhD Defense Opponent. The National University Hospital of Iceland, 2014.

Invited Speaker. Landspítali - The National University Hospital of Iceland

Dept of Immunology and Centre for Rheumatology Research, 2014.

Session Chair. Diet and Cancer mini symposium. Experimental Biology Annual ASN Meeting. 2014. San Diego, CA.

Invited Speaker. WCRF International and IASO 2013 Joint Conference on Obesity, Physical Activity and Cancer. London, UK. April, 2013.

Executive Committee. Diet and Cancer Research Interest Section for ASN, 2013-14

Session Chair. Diet and Cancer Molecular Targets mini symposium. Experimental Biology Annual ASN Meeting. 2013. Boston, MA.

Invited Speaker. East Carolina University. November, 2012.

Invited Speaker. Session Chair and Member of Faculty United European

Gastroenterology Week Meeting. Amsterdam 2012 “Adipokines and colorectal carcinogenesis”.

Chair. Diet and Cancer Research Interest Section for ASN, 2012-13 (Elected)

Invited Speaker. Physiology Seminar Series. Michigan State University. April, 2010.

Invited Speaker. Wayne State Lecture Series. March, 2010.

Invited Platform Presentation. Obesity Society Annual Scientific Meeting. Washington, DC. October, 2009.

Invited Platform Presentation. Sonia Wolf Wilson Lectureship “Leptin and Adiponectin: Key adipokines in inflammation and colon cancer”, University of Texas, Austin. 2007.

Invited Speaker GI Symposium Honoring Robert H. Whitehead, Vanderbilt University, Nashville, TN. 2006.

Invited platform presentation. AACR special conference: Cancer, Proteases, and the Tumor Microenvironment. Bonita Springs, FL. 2005.

Scholar-in-Training Award for meritorious abstract at the 2004 AACR Frontiers in Cancer Prevention Meeting. Seattle, WA. 2004.

Scholar-in-Training Travel Award for Conference: Dietary Supplement Use in Women: Current Status and Future Directions. Bethesda, MD. 2002.

Michigan State University, Animal Science Doctorate Student of the Year ‘99

University of Missouri Deans List: 1992-1993

Undergraduate Research Scholarship: 1992-1993

## **PROFESSIONAL SOCIETIES & MEMBERSHIPS:**

American Society for Nutrition: Member since 2001

American Society of the Advancement of Science: Member since 2001

The Obesity Society: Fellow member since 2009

American Society for Mass Spectrometry: Member 2015-2017

## **PUBLICATIONS:**

**According to Google Scholars, Dr. Fenton's papers have been cited a total of 1870 times item resulting in a h-index of 25. The h-10 index is 36 (the number of manuscripts with 10+ citations). Students mentored by Dr. Fenton underlined.** As a point of reference, it is convention in this field of science for the PI (laboratory that the scholarly works resulted from) of the student to be in the last author (senior author) position.

### **Submitted-2:**

- 1) Raghav J, Ezeamama AE, Sikorskii A, Yakah W, Zalwango S, Musoke P, Boivin M and **Fenton JI**. Serum n-6 fatty acids are positively associated with child growth in 6-to-10-year old Ugandan children regardless of HIV status – a cross-sectional study. *Nutrients*. April, 2019
- 2) Yin Z, Pickens CA, Sordillo LM, Zhang C and **Fenton JI**. Arachidonic acid-derived 5- and 11-hydroxyeicosatetraenoic acid (HETE) oxylipids are positively associated with polyp presence. *Metabolism*, Submitted January, 2019.

### **Published-Selected from 65 publications:**

- 1) Ezeamama AE, Sikorskii A, Bajwa R, Tuke R, Kyeyune R, **Fenton JI**, Guwatudde D, Fawzi WW. Evolution of Anemia Types During Antiretroviral Therapy—Implications for Treatment Outcomes and Quality of Life Among HIV-Infected Adults. *Nutrients*. 2019. Mar 31;11(4). pii: E755. doi: 10.3390/nu11040755.
- 2) Brokema S, Rowntree J, Jain R, Schwehofer JP, Bilter C, and **Fenton JI**. A nutritional survey of commercially available grass-finished beef. *Meat Science and Muscle Biology*. 2019. 3 (1), 116-126.
- 3) Crouch MJ, Kosaraju R, Guesdon W, Armstrong M, Reisdorph N, Jain R, **Fenton JI**, and Shaikh SA. Frontline Science: A reduction in DHA-derived mediators in male obesity contributes toward defects in select B cell subsets and circulating antibody. *Journal of Leukocyte Biology*. 2018 Dec 21. doi: 10.1002/JLB.3HI1017-405RR. [Epub ahead of print]
- 4) Adjepong M, Pickens CA, Jain R, Appaw W, and **Fenton JI**. Quantification of fatty acid and mineral levels of selected seeds, nuts, and oils in Northern Ghana. *Journal of Food Science and Technology*. 2018 Nov 55(11): 4615–4622. doi: 10.1007/s13197-018-3400-y.
- 5) Adjepong M, Yakah W, Jain R, Harris WS, Annan R, and **Fenton JI**. Whole blood fatty acids and growth parameters in 2-to-6-Year-Old Southern Ghanaian children. *Nutrients*. 2018. Jul 24;10(8). Pii E954. PMID 30042359
- 6) Ezeamama AE, Guwatudde D, Sikorskii A, Kabagambe EK, Spelts R, Vahey G, **Fenton JI**, and Fawzi WW. Impaired Hematologic Status in Relation to Clinical Outcomes among HIV-Infected Adults from Uganda: A Prospective Cohort Study. *Nutrients*. 2018 Apr 12;10(4). PMID: 29649107
- 7) Adjepong M, Yakah W, Harris WS, Annan RA, Pontifex MB, and **Fenton JI**. Whole blood n-3 fatty acids are associated with executive function in 2-6-year-old Northern Ghanaian children. *J Nutr Biochem*. 2018 Apr 4;57:287-293. PMID: 29852451
- 8) Jain R, Austin Pickens C, and **Fenton JI**. The role of the lipidome in obesity-mediated colon cancer risk. *J Nutr Biochem*. 2018. Mar 2;59:1-9. PMID: 29605789
- 9) Adjepong M, Pickens CA, Jain R, Harris WS, Annan RA, and **Fenton JI**. Association of whole blood n-6 fatty acids with stunting in 2-to-6-year-old Northern Ghanaian children: A cross-sectional study. *Plos One*. 2018. Mar 1;13(3):e0193301. PMID: 29494645
- 10) Davidson EA, Pickens CA, and **Fenton JI**. Increasing dietary EPA and DHA influence estimated fatty acid desaturase activity in systemic organs which is reflected in the red blood cell in mice. *Int J Food Sci Nutr*. 2018. Mar;69(2):183-191. PMID: 28697636
- 11) Valentini KJ, Pickens CA, Wiesinger JA, and **Fenton JI**. The effect of fish oil supplementation on brain DHA and EPA content and fatty acid profile in mice. *Intl J Food Sci Nutr*. 2017. Dec 18:1-13. PMID: 29252041
- 12) Pickens CA, Albuquerque Pereira MF, and **Fenton JI**. Long-chain  $\omega$ -6 plasma phospholipid polyunsaturated fatty acids and association with colon adenomas in adult men: a cross-sectional study. *Eur J Cancer Prev*. 2017. Nov; 26(6):497-505. PMID: 27768609
- 13) Pickens CA, Vasquez AI, Jones AD, and **Fenton JI**. Obesity, adipokines, and C-peptide are associated with distinct plasma phospholipid profiles in adult males, an untargeted lipidomic approach. *Sci Rep*. 2017. Jul 24;7(1):6335. PMID: 28740130
- 14) Adjepong M, Valentini K, Pickens CA, Li W, Appaw W, and **Fenton JI**. Quantification of fatty acid and mineral levels of selected seeds, nuts, and oils in Ghana. *J Food Compos Anal*. 2017. June;59:43-49. PMID: None

- 15) Pickens CA, Sordillo LM, Zhang C, and **Fenton JI**. Obesity is positively associated with arachidonic acid-derived 5- and 11-hydroxyeicosatetraenoic acid (HETE). *Metabolism*. 2017. May;70:177-191. PMID: 28403941
- 16) Ford C, Chang S, Vitolins MZ, **Fenton JI**, Howard BV, Rhee JJ, Stefanick M, Chen B, Snetselaar L, Urrutia R, and Frazier-Wood AC. Evaluation of diet pattern and weight gain in postmenopausal women enrolled in the Women's Health Initiative Observational Study. *Br J Nutr*. 2017. Apr;117(8):1189-1197. PMID: 28509665
- 17) Jumbe T, Comstock SS, Harris WS, Kinabo J, Pontifex MB, and **Fenton JI**. Whole blood fatty acids are associated with executive function in Tanzanian children aged 4-6 years: a cross-sectional study. *Br J Nutr*. 2016. Nov;116(9):1537-1545.
- 18) **Fenton JI**, Gurzell EA, Davidson EA, and Harris WS. Red blood cell PUFAs reflect the phospholipid PUFA composition of major organs. *Prostaglandins Leukot Essent Fatty Acids*. 2016. Sep;112:12-23. PMID: 27637336
- 19) Jumbe T, Pickens CA, Valentini K, Adjepong M, Li W, Kinabo J, and **Fenton JI**. Evaluation of fatty acid and mineral content of Tanzanian oils and seeds. *J Food Compos Anal*. 2016. July;50:108-113. PMID: None
- 20) Jumbe T, Comstock SS, Hahn SL, Harris WS, Kinabo J, and **Fenton JI**. Whole Blood Levels of the n-6 Essential Fatty Acid Linoleic Acid Are Inversely Associated with Stunting in 2-to-6 Year Old Tanzanian Children: A Cross-Sectional Study. *PLoS One*. 2016. May 3;11(5):e0154715. PMID: 27137223
- 21) Comstock SS, Xu D, Hortos K, Kovan B, McCaskey S, Pathak DR, and **Fenton JI**. Association of serum cytokines with colorectal polyp number and type in adult males. *Eur J Cancer Prev*. 2016. May;25(3):173-81. PMID: 25793917
- 22) Pickens CA, Matsuo KH, and **Fenton JI**. Relationship Between Body Mass Index, C-Peptide, and Delta-5-Desaturase Enzyme Activity Estimates in Adult Males. *PLoS One*. 2016. Mar 29;11(3):e0149305. PMID: 27023786
- 23) Pickens CA, Lane-Elliot A, Comstock SS, and **Fenton JI**. Altered Saturated and Monounsaturated Plasma Phospholipid Fatty Acid Profiles in Adult Males with Colon Adenomas. *Cancer Epidemiol Biomarkers Prev*. 2016. Mar;25(3):498-506 PMID: 26721667
- 24) Teague H, Harris M, Whelan J, Comstock SS, **Fenton JI**, and Shaikh SR. Short-term consumption of n-3 PUFAs increases murine IL-5 levels, but IL-5 is not the mechanistic link between n-3 fatty acids and changes in B cell populations. *J Nutr Biochem*. 2016. Feb;28:30-6. PMID: 26878780
- 25) Duriancik DM, Comstock SS, Langohr IM, and **Fenton JI**. High levels of fish oil enhance neutrophil development and activation and influence colon mucus barrier function in a genetically susceptible mouse model. *J Nutr Biochem*. 2015. Nov;26(11):1261-72. PMID: 26297475
- 26) Gurzell EA, Teague H, Duriancik D, Clinthorne J, Harris M, Shaikh SR, and **Fenton JI**. Marine fish oils are not equivalent with respect to B-cell membrane organization and activation. *J Nutr Biochem*. 2015. Apr;26(4):369-77. PMID: 25616447
- 27) Pickens CA, Sordillo LM, Comstock SS, Harris WS, Hortos K, Kovan B, and **Fenton JI**. Plasma phospholipids, non-esterified plasma polyunsaturated fatty acids and oxylipids are associated with BMI. *Prostaglandins Leukot Essent Fatty Acids*. 2015. Apr;95:31-40. PMID: 25559239
- 28) Jung SY, Vitolins MZ, **Fenton JI**, Frazier-Wood AC, Hursting SD, and Chang S. Risk profiles for weight gain among postmenopausal women: a classification and regression tree analysis approach. *PLoS ONE*. 2015. Mar 30;10(3):e0121430. PMID: 25822239
- 29) Paxton RJ, Jung SY, Vitolins MZ, **Fenton JI**, Paskett E, Pollak M, Hays-Grudo J, Hursting SD, and Chang S. Associations between time spent sitting and cancer-related biomarkers in postmenopausal women: an exploration of effect modifiers. *Cancer Causes Control*. 2014. Nov;25(11):1427-37. PMID: 25238978
- 30) Comstock SS, Xu D, Hortos K, Kovan B, McCaskey S, Pathak DR, and **Fenton JI**. Association of insulin-related serum factors with colorectal polyp number and type in adult males. *Cancer Epidemiol Biomarkers Prev*. 2014. Sep;23(9). PMID: 24962837
- 31) Gurzell EA, Wiesinger JA, Morkam C, Hemmrich S, Harris WS, and **Fenton JI**. Is the omega-3 index a valid marker of intestinal membrane phospholipid EPA+DHA content? *Prostaglandins Leukot Essent Fatty Acids*. 2014. Sep;91(3):87-96. PMID: 24913088

## **FUNDING:**

### **Current Grant Funding:**

PI: Rowntree, Jason; Co-Is Fenton, Jenifer, Hodbod, Jennifer, McKendree, Melissa, Schweihofer, Jeannine  
 Sponsor: MSU-Michigan Alliance for Animal Agriculture  
 Title: Enhancing healthfulness and demand of Michigan produced beef  
 Pending: \$143,629.00

PI: Rowntree, Jason; McKendree, Melissa; Cassida, Kimberly; Fenton, Jenifer; Cho, Sungeun Schwehofer, Jeannine  
North Central Region Sustainable Agriculture Research and Education (NCR-SARE) Program  
Title: Enhancing healthfulness and demand of Upper Midwestern, locally produced beef  
Project Coordinator: Jason Rowntree  
Funded: \$199,149

PI: Pestka, James; Harkema, Jack; Fenton, Jenifer (co-I)  
Direct Grantor: National Inst of Health.  
Title: Dietary Lipids and Silica-Triggered Autoimmunity  
Funded: \$2,700, 286.00

PI: Pestka James, Harkema, Jack; Fenton, Jenifer (co-I)  
Direct Grantor: Lupus Foundation of America Inc  
Title: PREVENTION OF SILICA-TRIGGERED LUPUS BY LIPIDOME MODULATION  
Funded: \$104,981.00

Co-Investigator: Fenton, JI  
Agency for International Development. Title: Food and Nutrition Technical Assistance - FANTA III. 3,976,303.00

#### **Past Grant Funding:**

PI: Fenton, Jenifer Project Director: Pickens, Charles  
Title: Tandem Mass Spectrometry to Identify Novel Lipid Biomarkers of Obesity  
Direct Grantor: USDA  
Funded: \$78,960

PIs: Fenton, Jenifer and Mary Adjepong  
Direct Grantor: University of California Davis  
Project Amount Requested: \$19,991.50  
Prime Grantor: US Agency for Intl Development; LEAP proposal

Clinical and Translation Sciences Institute, MSU. Title: Mass spectrometry to identify lipid and proteomic biomarkers of colon polyp risk.  
PI: Fenton, JI  
Funded: \$28,000

National Cancer Institute, NIH: Cancer Prevention Research Small Grant Program (R03): Cancer Cause and Prevention.  
Title: Effect of dietary omega 3 fatty acids on colitis and colon cancer development in SMAD3<sup>-/-</sup> mice. Funded- (9-1-11 to 8-31-13)  
R03CA162427; \$153,500  
PI: Fenton, JI (10% effort)

Clinical and Translation Sciences Institute, MSU  
Title: Novel Biomarker Detection for Obesity, Inflammation, and Colon Cancer Risk (Suppl)  
Funded- (8-1-09 to 7-31-10); \$17,890  
PI: Fenton, JI

National Cancer Institute, NIH: Cancer Prevention Research Small Grant Program (R03): Cancer Cause and Prevention Research. Title: Biomarkers of Obesity, Inflammation and Colon Cancer  
Funded- (8-1-09 to 12-31-11)  
R03CA142000; \$153,000  
PI: Fenton, JI



National Cancer Institute, NIH: Cancer Prevention Research Small Grant Program (R03): Cancer Cause and Prevention Research. Title: Adipokines regulate colon epithelial cell homeostasis.  
Funded- (7-1-07 to 6-30-09)  
R03CA130033; \$152,000.  
PI: Jenifer Fenton  
IRGP New Investigator Award-Michigan State University  
Title: Novel Biomarker Detection for Obesity, Inflammation, and Colon Cancer Risk  
\$40,000

**Other Funding (Undergraduate research funding):**

Fenton, Jenifer Imig (Co-Principal), Vanessa Tan (Co-Principal), " Max Gozenbach & Dale Romsos Undergraduate Research Scholarship," Sponsored by FSHN, Michigan State University, \$3,500.00. (Fall 2017)

Fenton, Jenifer Imig (Co-Principal), Carlos Diola (Co-Principal), " Max Gozenbach Undergraduate Research Scholarship," Sponsored by FSHN, Michigan State University, \$3,000.00. (Fall 2017)

Fenton, Jenifer Imig (Co-Principal), Kelly Valentini (Co-Principal), " Max Gozenbach FSHN Undergraduate Research Scholarship," Sponsored by FSHN, Michigan State University, \$3,000.00. (Fall 2016)

Fenton, Jenifer Imig (Co-Principal), Kelly Valentini (Co-Principal), "CANR Undergraduate Research Scholarship," Sponsored by CANR, Michigan State University, \$2,000.00. (Fall 2015; Spring 2016).

Fenton, Jenifer Imig (Co-Principal), Emily Davidson (Co-Principal), "Max Gozenbach Undergraduate Research Scholarship," Sponsored by FSHN, Michigan State University, \$2,000.00. (2015 – 2016).

Fenton, Jenifer Imig (Co-Principal), Emily Davidson (Co-Principal), "CANR Undergraduate Research Scholarship," "Sponsored by CANR, Michigan State University, \$2,000.00. (2014 – 2015 summer and Fall).

Fenton, Jenifer Imig (Co-Principal), Emily Davidson (Co-Principal), "Max Gozenbach Undergraduate Research Scholarship," Sponsored by FSHN, Michigan State University, \$2,000.00. (2014 – 2015).

Fenton, Jenifer Imig (Co-Principal), Diana Xu (Co-Principal), "CNS Undergraduate Research Scholarship," Sponsored by FSHN, Michigan State University, \$1,000.00. (2014).

Fenton, Jenifer Imig (Co-Principal), Diana Xu (Co-Principal), "CNS Undergraduate Research Scholarship," Sponsored by FSHN, Michigan State University, \$1,000.00. (2014).

Fenton, Jenifer Imig (Co-Principal), Emily Davidson (Co-Principal), "Dale Romsos Undergraduate Research Scholarship," Sponsored by FSHN, Michigan State University, \$1,500.00. (2013 – 2014).

Fenton, Jenifer Imig (Co-Principal), Sophia Hemmrich (Co-Principal), "Rachel Schemmel Undergraduate Research Scholarship," Sponsored by FSHN, Michigan State University, \$1,500.00. (2012 – 2013).

Fenton, Jenifer Imig (Co-Principal), Gopalakrishnan, Anita (Co-Principal), "CANR Undergraduate Research Scholarship," Sponsored by CANR, Michigan State University, \$1,800.00. (December 2010 – May, 2011).

Fenton, Jenifer Imig (Co-Principal), Gopalakrishnan, Anita (Co-Principal), "CANR Undergraduate Research Scholarship," Sponsored by CANR, Michigan State University, \$1,620.00. (September 2010 – December, 2010).

Fenton, Jenifer Imig (Co-Principal), Coffman, Andrea (Co-Principal), "CANR Undergraduate Research Scholarship Program," Michigan State University, \$2,000.00. (September 2009 - December 2010).

Fenton, Jenifer Imig (Co-Principal), Woodworth, Hillary L (Co-Principal), "CNS Undergraduate Research Scholarship," Sponsored by College of Natural Science, Michigan State University, \$1,000.00. (January 2010 - May 2010).

Fenton, Jenifer Imig (Co-Principal), Gopala, Anita (Co-Principal), "Lyman Briggs Undergraduate Research Scholarship," Sponsored by CANR, Michigan State University, \$1,000.00. (January 2010 - May 2010).

Fenton, Jenifer Imig (Co-Principal), Gopalakrishnan, Anita (Co-Principal), "CANR Undergraduate Research Scholarship," Sponsored by CANR, Michigan State University, \$2,000.00. (January 2010 - May 2010).

Fenton, Jenifer Imig (Co-Principal), Woodworth, Hillary Lauren (Co-Principal), "CNS Undergraduate Research Scholarship," Sponsored by College of Natural Science, Michigan State University, \$1,000.00. (October 1, 2009 - December 15, 2009).

Fenton, Jenifer Imig (Co-Principal), Woodworth, Hillary (Principal), "Honors College Travel Grant," Sponsored by Honors College, Michigan State University, \$825.00. (November 2009).

Fenton, Jenifer Imig (Co-Principal), Fitzgerald, Brenna (Co-Principal), "CANR Undergraduate Research Program (URP)," Michigan State University, \$800.00. (August 2008 - May 2009).

Fenton, Jenifer Imig (Co-Principal), Woodworth, Hillary (Co-Principal), "CNS Undergraduate Research Support Scholarship," Sponsored by College of Natural Science, Michigan State University, \$1,000.00. (February 13, 2009 - May 1, 2009).

#### **ACADEMIC SERVICE:**

Reviewed for over 40 journals.

#### **EDITORIAL POSITIONS:**

Editorial Board Member. Nature Scientific Reports. 2018-current

Editorial Board Member. PlosOne. 2018-current

Guest Editor for Special Issue of Nutrients. 2017-2018

Associate Editor. Journal of Nutritional Biochemistry. 2016-current

Guest Editor. Journal of Obesity. Special issue. 2011-2012

Associate Editor. World Journal of Gastroenterology. 2010-current

#### **GRANT PANEL LEADERSHIP AND SERVICE:**

Panel Manager. USDA NIFA fellowship program. 2016-2017 and 2017-2018.

Panel Member. American Cancer Society Grant Program. 2017-current; 6-2018

Ad Hoc Reviewer Florida Department of Health. 12-2016, 12-2017, 1-2019

Panel Member. USDA-NIFA. 6-2016.

Ad Hoc reviewer. Israeli Ministry of Health "Food and Nutrition Implications on Human Health" program. 4-2016

Ad Hoc Reviewer Florida Department of Health 12-2015, 12-2016, 12-2018

Ad Hoc Reviewer Paracelsus Medical University's Review Board for Research Funding, Salzburg/Austria (1 proposal). 8-2014

Ad Hoc Reviewer Qatar National Research Fund, 2012, 2013, 2014

Ad Hoc Reviewer CDP study section (NCI), NIH. 12-2013 (3 proposals)

Ad Hoc Reviewer Pennsylvania Department of Health Final Performance Review 10-2013

Ad Hoc Reviewer National Cancer Institute Study Section. 10-2013 (3 proposals)

Ad Hoc Reviewer World Cancer Research Fund. 3-2013. (1 proposal)

Ad Hoc Reviewer Dairy Farmers of Canada. Dairy Research Cluster 2 Initiative: Dairy Research for a Healthy World. 9-2012

Ad Hoc Reviewer Pennsylvania Department of Health Final Performance Review 8-2012

Special Emphasis Panel 2012/05 ZCA1 SRLB-9 (M1) Provocative Questions (R01) 3-2012 (3 proposals)

Special Emphasis Panel 2012/05 ZCA1 SRLB-D (M1) Provocative Questions (R21) 3-2012 (1 proposal)

Peer Reviewed Medical Research Program (PRMRP) FY12 Visionary Postdoctoral Fellowship Applications.

Teleconference Scientific Reviewer. 01-12 (1 proposal)

Peer Reviewed Medical Research Program (PRMRP) FY10 Inflammatory Bowel Disease Concept Award pre-proposals grant program. Reviewer. 06-10 (7 proposals)

Peer Reviewed Medical Research Program (PRMRP) FY10 Inflammatory Bowel Disease Concept Award grant program. Reviewer. 05-10 (5 proposals)  
Ad Hoc Reviewer Broad Foundation. Reviewer for continuation funding of one proposal. 8-10.  
Medical Research Scotland, ad hoc Reviewer, Grant Proposal 7-09  
Peer Reviewed Medical Research Program (PRMRP) FY09 Inflammatory Bowel Disease grant program. Reviewer. 06-09 (6 proposals)  
Peer Reviewed Medical Research Program (PRMRP) FY08 Inflammatory Bowel Disease grant program. Reviewer. 09-08 (6 proposals)

**SUPERVISOR (SUMMARY):**

8 Graduate Students-mentor  
5 Visiting Research Assistant Professor  
15 Guidance committees-member  
39 Undergraduate and/or other students with research projects in my laboratory

**GRADUATE STUDENTS:**

Thesis Advisor: Tatum Goldufsky, Masters Student Human Nutrition. Graduated 5-2018

Thesis Advisor: Zhe Yin, Masters Student Human Nutrition. Graduated 5-2018

Dissertation advisor: Mary Adjepong, Doctoral Student Human Nutrition. Graduated. 5-2018  
Ghana BHEARD fellowship recipient; LEAP grant recipient  
Position: CEO and Nutrition Consultant at Diet-trust foods and Nutrition Consult, Kumasi, Ghana

Dissertation advisor: Austin Pickens, Doctoral Student Human Nutrition. Graduated 5-2017  
2103-2014 AAGA Fellowship Recipient  
Position: Data Scientist, CDC

Dissertation advisor: Teddy Jumbe, Doctoral Student Human Nutrition. Graduated 12-2015  
USAID Fellowship Recipient  
Position: Senior Lecturer, Sokoine University of Agriculture

Dissertation advisor: Eric Gurzell, Doctoral Student Human Nutrition. Graduated 8-2014  
Graduate Student Study Abroad Fellowship Program Recipient (SU 2013)  
Dissertation Completion Fellowship recipient 2014.  
Position: Visiting Assistant Professor, Western Illinois University

Thesis advisor: Sarah McCaskey, Masters Student Human Nutrition. Graduated 8-2010  
Position: Research Coordinator MSU COM

Thesis advisor: Janette Birmingham, Masters Student Human Nutrition. Graduated 12-2009  
Position: Research Technician

**VISITING SCIENTISTS (Postdoctoral students):**

Lei Wan, PhD. 2015. Position: Research Assistant, U of M.  
Sarah Comstock, PhD. 2012-2014. Position: Research Assistant Professor, MSU  
Elizabeth Rondini, PhD, RD. 2010-2012. Position: Research Scientist, U of M  
Hanan Omar, PhD. 2008-2009. Position: Retired  
Jennifer Gray, PhD. 2008 Position: Toxicologist, State of Michigan

**GRADUATE COMMITTEE MEMBERSHIP:**

Liz Hudson, PhD committee-Epidemiology 2018-current  
Ryan Walker, PhD Committee- Human Nutrition-2014-current  
Alison Boss, MS committee-Human Nutrition 2016-current  
Sara Bronkema, MS committee-Animal Science 2016-2018

Melissa Bates, PhD committee-Food Science 2013-2018  
Tyler Becker, PhD committee-Human Nutrition 2014-2016  
Yueli Liu, PhD committee-Chemistry 2011-2015  
Glory Mhalu, MS Committee-Human Nutrition-2012-2014  
Ryan Walker, MS Committee-Food Science 2011-2013  
Sarah Mattmiller, MS committee-Comparative Medicine & Integrative Biology 2011-2014  
Brooke Roman, MS Committee-Human Nutrition-2011-2013  
Jon Clinthorne, PhD Committee -Human Nutrition 2009-2013  
Lori Houghton-Rahrig, PhD committee-College of Nursing 2009-2012  
Brenna Flannery, PhD Committee-Food Science 2009-2012  
Amanda Metz, MS committee-Human Nutrition 2006-2008

#### **UNDERGRADUATE STUDENT RESEARCH PROJECTS:**

Srikar Kesammi-Professorial Assistant (Fall-current)  
Selin Sergin-Professorial Assistant (Fall 2018-current)  
Travis Gooden-Professorial Assistant (Fall 2017-current)  
Carlos Diola- Undergraduate Research Assistant (Fall 2017-Spring 2019)  
    Max Gonzenbach Research Scholarship (Fall 2016-Fall 2018)  
William Yakah-Undergraduate Research Assistant (Fall 2016-Spring 2019)  
    Honors College Research Scholar (Fall 2016-Spring 2019)  
Vanessa Tan-Undergraduate Research Assistant (Fall 2016-Fall 2018)  
    Max Gonzenbach Research Scholarship (Fall 2016-Fall 2018)  
Raghav Jain-Professorial Assistant (Summer 2016-Fall 2018)  
    ULAF HNF250; Outstanding Biochemistry Senior Award  
    Board of Trustee Scholar  
Louanges Ndayishimiye-Undergraduate Research Assistant (Fall 2016-Spring 2016)  
Lauren Bernhardt- Professorial Assistant (Fall 2015-Spring 2016)  
Kelly Valentini-Professorial Assistant (Fall 2013-Summer 2017)  
    ULAF HNF250  
    Dale Romsos Research Scholarship (2016-2017)  
    Rachel Schemmel Scholarship (2015-2016; 2016-2017)  
    CANR Research Scholarship (2015- 2016)  
Diana Xu-Professorial Assistant (Fall 2012-Spring 2016)  
    Professor Richard L. Anderson Endowed Undergraduate Research Prize (2014)  
    CNS Undergraduate Research Scholarship (Fall 2014)  
Emily Davidson-Undergraduate Research Assistant (Spring 2013-Summer 2016)  
    Rachel Schemmel Scholarship (2014-2015)  
    Dale Romsos Research Scholarship (2013-2014)  
    CANR Research Scholarship (2014- 2015)  
Karen Matsuo- Undergraduate Research Assistant (Summer 2014-Summer 2015)  
Ami Lane-Elliot- Undergraduate Research Assistant (Spring 2014-Summer 2015)  
Samantha Hahn- Undergraduate Research Assistant (Spring 2014-Summer 2015)  
    NSF Scholarship (2014-2015)  
Mariana de Fatima Albuquerque Periera  
    Brazil Americas Fellow (semester abroad)  
Avery Clinton- Undergraduate Research Assistant (Summer 2014)  
Catherine Belcher- Undergraduate Research Assistant (Spring 2013-Summer 2014)  
Amanda Martin- Undergraduate Research Assistant (Spring 2013)  
Aamir Bandagi-Undergraduate Research Assistant (Spring 2013-Summer 2014)  
Jeremy Ratiu-Undergraduate Research Assistant (Spring 2010-Spring 2014)  
Markita Lewis- Summer Research Opportunities Program (SROP) (2013)  
    Nominated for 2013 Exemplary Summer Research Citation  
Belinda Trinh – Summer 2013 Future Scientist Program (2013)  
Taylor Nordberg- Undergraduate Research Assistant (Spring 2012-Summer 2013)  
Erin Person-Undergraduate Research Assistant (Summer 2013)

Sophia Hemmerich-FSHN Research Scholarship F-S'2011, 2013 (Spring 2010-Summer 2013)  
Ryan Kelly- Undergraduate Research Assistant (Spring 2012)  
Katy Patten-Undergraduate Research Assistant (Fall 2011-2012)  
Rachel Plawecki-Professorial Assistant (Fall 2009-Spring 2010)  
Andrea Coffman-CANR Research Scholarship (2008- 2009)  
Anita Gopalakrishnan-CANR Research Scholarship S'10 (2008-2012)  
Hillary Woodworth-CNS Research Scholarship-3 semesters (Fall 2007-2010)  
Brenna Fitzgerald-CANR Research Scholarship (Fall 2008- 2009)  
Hanna Webb- Professorial Assistant (2008-2009)  
Roberto Antonio-Brandao-Undergraduate Research Assistant (2007-2008)  
Camille Secor-Independent study (Fall 2007-Spring 2008)  
Michelle Mercer-Undergraduate Research Assistant (2006-2008)  
Jennifer Wilson-Medical student summer research project (summer 2008)  
Christine Lockwood- Undergraduate Research Assistant (outstanding undergraduate employee of 2008)

**TEACHING (Michigan State University):**

Human Nutrition and Chronic Disease (HNF 840): Co-instructor 2019 Fall. 3cr.  
Contemporary Issues in Human Nutrition (HNF 250): Lead Instructor 2019 Fall. 3cr.  
Study Abroad Faculty Coordinator and Instructor. Mediterranean Diet and Health. Greece - Summer 2019. 3cr  
Food Laws Study abroad. Co-Instructor. Spring 2019. 4 cr  
Independent Study Research (HNF 490) Spring 2019. 3cr.  
Contemporary Issues in Human Nutrition (HNF 250): Lead Instructor. Fall 2018. 3cr. (Significant course development-increase from 2 to 3 cr)  
Independent Study Research (HNF 490) Spring 2018 and Fall 2018. 3cr.  
Contemporary Issues in Human Nutrition (HNF 250): Lead Instructor 2017. 2cr. (Significant course development-3 section increase from 2016 to 5 sections total)  
Obesity and Chronic Disease (HNF 826): Lead Instructor. 1cr. Spring 2013, 2014, 2015, 2016, 2017, 2018  
Study Abroad Faculty Coordinator and Instructor. Mediterranean Diet and Health. Italy - Summer 2017. 3cr  
Contemporary Issues in Human Nutrition (HNF 250): Lead Instructor 2016. 2cr. Fall 2016 (New course development)  
Study Abroad Faculty Coordinator and Instructor. Mediterranean Diet and Health. Italy - Summer 2016. 3cr (New course development)  
Study Abroad Faculty Assistant. Sustainable Food, Environment & Social Systems in Australia - Summer 2015. 6cr  
Advanced Human Nutrition: Carbohydrate, Lipid Protein Metabolism (HNF461) Coordinating Instructor (3cr) Fall 2014  
Human Nutrition and Chronic Disease (HNF 840): Lead Instructor 2009, 2011, 2013. 3cr.  
Nutritional Epidemiology (EPI 814). Spring 2012. Guest lecture.  
Individual & Family: Health Status Outcomes Across the Lifespan (Nursing 910). Spring 2010. Guest Lecture.  
Nursing Research Practicum (NUR-940) Summer 2009. 1cr.  
Introduction to Human Nutrition (HNF 150) Instructor Section 001. Spring '07