

Fish Preference Analytics Using Social Media and Sentiment Analysis

Theme B: Education & Workforce Development - Producer Education & Training / Consumer Education / Transposing producer information into consumer information and formats.

Theme C: Marketing - Social Media training, value comparisons / Awareness.

Chairperson: Kwamena K. Quagraine
Industry Liaison: Amy M. Shambach
Extension Liaison: Nicole Wright
Funding Request: \$193,452
Duration: 01/01/2024 – 12/31/25

Objectives

1. Apply sentiment analysis to assess sentiments on major North Central Region (NCR) farmed fishes from the Internet of Things (IoT) perspective utilizing online listening tools including social media.
2. Quantify online sentiments of consumers in terms of positivity and negativity associated with food and sport fishes over time – farmed and wild-caught for the U.S. and various census regions.
3. Categorize online contents and highlight patterns of how people perceive farmed versus wild fish in the food fish and sport fish industries; the change over time, and identifying shocks and relevant events that are associated with the change in sentiments for the U.S. and various census regions.
4. Assess implications of online media chatter data for the U.S. aquaculture industry.
5. Develop outreach materials based on results to improve the understanding of Americans’ perceptions of farmed fish from online chatter.

Deliverables

- i. Comprehensive report on public sentiment towards aquaculture in general and specifically, major NCR species - largemouth bass, yellow perch, walleye, bluegill, tilapia and rainbow trout and how they differ over time.
- ii. A detailed analysis of sentiment fluctuations in the U.S. and various census regions - more positively or more negatively over the period of study and the connection to specific events.
- iii. Two in-person workshops (food fish and sport fish), focusing connecting the industry with online media technology, responding to trending issues, maximizing positive interactions with online consumers, and playing up the strengths of aquaculture to provide value for farmed fish.
- iv. One virtual program (food fish and sport fish), focusing connecting the industry with online media technology, responding to trending issues, maximizing positive interactions with online consumers, and playing up the strengths of aquaculture to provide value for farmed fish.
- v. Two Outreach brochures on how the aquaculture industry (food fish and sport fish) can utilize the potential of social network, and professionally communicate its value in specialized media profiles.

Proposed Budgets

Institution/Company	Principal Investigator(s)	Objective(s)	Year 1	Year 2	Total
Purdue University	Kwamena Quagraine & Amy Shambach	1,2,3,4 & 5	\$82,912	\$87,909	\$170,822
The Ohio State University	Nicole Wright	4 & 5	\$0.00	\$22,630	\$22,630
Total			\$82,912	\$110,539	193,452

Project Summary

Recent scientific research emphasizes on big data analytics using large datasets. Sentiment analysis, a form of data analytics utilizes people's written views on online platforms such as microblogging services, social networking sites and short messaging services to discover customer needs. It is consistent with assessing consumer preferences and an alternative research approach to using interviews and surveys to solicit sentiments. Online written expressions can be quantified associating them positively or negatively with an issue and companies are increasingly using sentiment analysis to assess public perceptions, inform marketing campaigns, measure product performance, track sentiment toward a brand or company, and manage opinions and sentiments. This project will apply sentiment analysis to assess online sentiments on select fish species from the Internet of Things (IoT) perspective and quantify positive / negative sentiments associated with the species (farmed and wild-caught) for the U.S. and census regions. We focus on largemouth bass, yellow perch, walleye, bluegill, tilapia and rainbow trout. The analysis has implications for the aquaculture industry in the North Central Region (NCR) because these are major species produced in the region and online chatter would provide valuable insights into consumer mood, perceptions and potential demand signals for these fishes.

Justification

The U.S. aquaculture industry strives to supply healthy and quality fish products that meet required health and environmental regulations, food safety standards, as well as social and customer acceptability of aquaculture. However, unlike other animal protein production where farming is the norm, fish and seafood in general continues to face public comparisons between wild-caught fish and farmed-fish production. That is why the aquaculture industry continues to address public acceptability challenges through marketing attributes such as sustainability, hormone-free production, animal welfare, eco-labeling, 3rd party certifications, e.g., best aquaculture production practices, etc., to assure quality. Largemouth bass, yellow perch, walleye, bluegill, tilapia and rainbow trout are major aquaculture species in the NCR and every effort should be harnessed to grow production, acceptability and reputation as valuable aquaculture species. Whitmore, et al. (2022) suggests that public sentiments about fish farming relate to seven themes: Environmental values, economic values, trust in government and regulating agencies, knowledge of aquaculture, perceptions of health and safety, and perceptions of real or potential use-conflict. Thus, understanding the public sentiment towards these fish species and consequently, the NCR aquaculture industry is fundamental to understanding the 'what' and the 'why' of opinions and views expressed by various consumers and customers. Such analysis also provides a roadmap for assessing how different factors affect views of the industry and farmed seafood. It gives insights into forming strategic initiatives towards achieving social sustainability prospects of aquaculture (Whitmore, et al., 2022). In addition, assessing sentiments and patterns of public perceptions is especially useful for formulating national and industry-level policies and development initiatives for aquaculture. Researchers have even assessed trends in online activity and sentiment level comparing them with changes in the price of products to investigate how

online media volume and sentiment surrounding those products may, or may not, be related to the market valuation of those products (see Ellman et al., 2023; Ortez et al., 2023).

Media analytics is a common approach that is increasingly being used to assess perceptions, preferences, and emotions about products. Professionalization of online media analysis of user sentiments is important for industry research into the patterns and trends in sentiments of stakeholders because of social networks' influence and potential impact on stakeholder perceptions and social acceptability of products. People post online comments about various issues including news, products, politics, etc. By writing online posts, people express their feelings and opinions about different things, such as agreeing or disagreeing, satisfaction or dissatisfaction, their interpretation of various topics or events, etc. Thus, taking a proactive communication strategy and having an active online presence can be adopted by the aquaculture industry in ensuring social acceptability of aquaculture products. However, it appears there are few studies on such strategies on the aquaculture industry as is being examined for other animal protein industries - dairy products, i.e., milk, cheese, ice cream and yogurt (Ortez et al., 2023); meats, i.e., beef, pork, chicken and turkey (Widmar et al., 2022); food safety-related incidents such as foodborne illness outbreaks and/or food recalls (Jung et al., 2021); eggs (Widmar et al., 2020); honey (Ellman et al., 2023); Halal foods (Feizollah et al., 2019); salmon (Glutting, 2022). In a study of the use of social media in aquaculture, Baraibar-Diez et al. (2023) found that there is great potential for the use of social networks to communicate and improve the acceptance of aquaculture. The authors used sentiment analysis of tweets issued by different stakeholders related to Spanish aquaculture, including producers, specialized media, associations, and research centers and found that the underutilization of social networks by the industry shows communication gaps but major potential for improvement. Similarly, Glutting (2022) examined Twitter data to assess sentiments on the Canadian salmon aquaculture industry and concluded that understanding stakeholder sentiment can allow a government, individual, or group to be more proactive in its decision-making rather than reactive. The author also suggests that harnessing online chatter information allows for open dialogue of all stakeholders and promotes future research, analysis, and collaboration within the aquaculture industry (Glutting, 2022).

Related Current and Previous Work

The PI is working with a group of researchers at Purdue University studying online sentiment and mentions associated with disruptions to meat markets including seafood in the U.S. food system during the COVID-19 pandemic that spurred mass media attention. The study assesses online activities during the COVID-19 pandemic to provide any insights on changes to online and/or social media activities surrounding meats relative to market dynamics.

Statement Regarding Duplication of Research

This proposed study is original and not a duplication of any previous study. We accessed the USDA Current Research Information System (CRIS or REEport), the National Sea Grant Office

Funding Page, prior Sea Grant-funded projects, and the NOAA Office of Aquaculture Funding Opportunities page using keywords “seafood sentiment analysis” and “seafood online media analytics” and did not find any study with these keywords.

Anticipated Benefits

Research on sentiment is relevant and significant for several reasons. *First*, it provides insights into perceptions about the selected species allowing producers, industry, researchers and policy makers to gauge public opinion and attitudes. This information then can help industry make appropriate, feasible, and accurate strategic choices. *Second*, sentiment analysis helps to understand and assess market demand for the species. Positive sentiment can indicate a growing interest in a species, potentially leading to increased demand and market expansion. On the other hand, a negative sentiment might suggest barriers to demand, such as concerns about the environment, safety, and/or sustainability factors. Thus, net sentiment analysis can assist industry in identifying areas for improvement and developing targeted interventions to address customer concerns. Results from such analysis can inform marketing campaigns and measure product performance. *Third*, producers and distributors can also monitor net sentiment to control and manage opinions, sentiments and reputation. By tracking sentiment over time, they can identify potential issues, complaints, or negative trends that could harm the brand or the industry as a whole. Promptly addressing these concerns and engaging with customers can help maintain a positive reputation and build trust in the aquaculture industry. *Fourth*, net sentiment analysis can provide policy makers and regulatory bodies with insights to help shape policies, regulations, and guidelines that consider customer satisfaction and address concerns effectively. By understanding net sentiment, policymakers can make informed decisions that promote the aquaculture industry's growth while safeguarding environmental sustainability and public satisfaction.

Objectives

The overarching research questions that the project seeks to answer are how public sentiment towards the selected species (largemouth bass, yellow perch, walleye, bluegill, tilapia and rainbow trout) differs (positive or negative) over time and whether public sentiment towards the species differs among regional groups. Specific objectives of the study are:

1. Apply sentiment analysis to assess sentiments on major NCR farmed fishes from the Internet of Things (**IoT**) perspective utilizing online listening tools including social media.
2. Quantify online sentiments of consumers in terms of positivity and negativity associated with food and sport fishes over time – farmed and wild-caught for the U.S. and various census regions.
3. Categorize online contents and highlight patterns of how people perceive farmed versus wild fish in the food fish and sport fish industries; the change over time, and identifying shocks and relevant events that are associated with the change in sentiments for the U.S. and various census regions.

4. Assess implications of online media chatter data for the U.S. aquaculture industry.
5. Develop outreach materials based on results to improve the understanding of Americans' perceptions of farmed fish from online chatter.

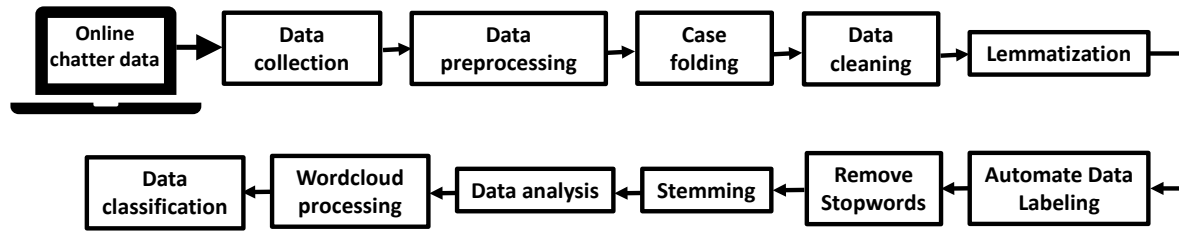
Deliverables

- i. Comprehensive report on public sentiment towards aquaculture in general and specifically, major NCR species - largemouth bass, yellow perch, walleye, bluegill, tilapia and rainbow trout and how they differ over time.
- ii. A detailed analysis of sentiment fluctuations in the U.S. and various census regions - more positively or more negatively over the period of study and the connection to specific events.
- iii. Two in-person workshops (food fish and sport fish), focusing connecting the industry with online media technology, responding to trending issues, maximizing positive interactions with online consumers, and playing up the strengths of aquaculture to provide value for farmed fish.
- iv. One virtual program (food fish and sport fish), focusing connecting the industry with online media technology, responding to trending issues, maximizing positive interactions with online consumers, and playing up the strengths of aquaculture to provide value for farmed fish.
- v. Two Outreach brochures on how the aquaculture industry (food fish and sport fish) can utilize the potential of social network, and professionally communicate its value in specialized media profiles.

Procedures

The conceptual framework for this project is stakeholder theory, which postulates that an industry must understand its stakeholders and their needs and meet them (Freeman et al., 2018); and the analytical approach to be applied is the software-assisted sentiment analysis, sometimes called opinion mining. Sentiment analysis is multidisciplinary field that includes computational linguistics, information retrieval, semantics, natural language processing, artificial intelligence and machine learning (Ferreira & Pereira, 2019; Öztürk & Ayvaz, 2018; Aydoğan & Akcayol, 2016). Sentiment analysis utilizes natural language processing and is a software-assisted programming that researchers can use on text to extract people's feelings, opinions, and thoughts (Ferreira & Pereira, 2019; Öztürk & Ayvaz, 2018). The research procedure follows Mustaqim et al. (2020) and outlined below in Figure 1. The analysis will rely on data mining techniques and natural language processing to find, retrieve, and refine information and opinions from extensive text sources including Twitter, Instagram, online forums, news, blogs, consumer reviews and comments, Tumblr and other active online forums. The process allows the extraction of quantitative information in texts and the sentiments about them. The analysis will cover the period from 2014 to 2023.

Figure 1: Research procedure



Source: Mustaqim et al. (2020).

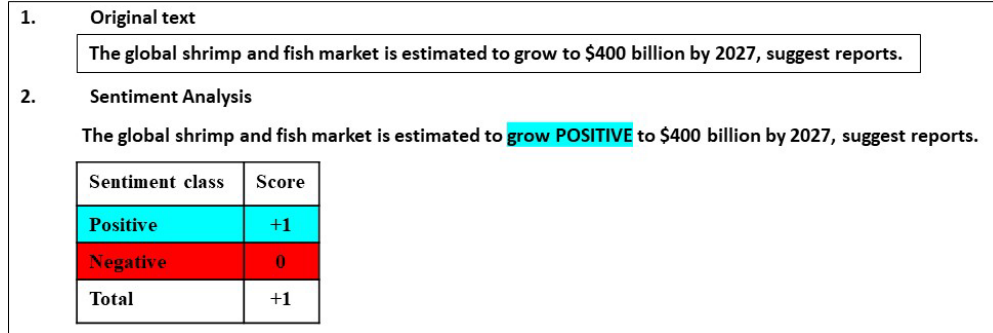
Objective 1:

This study will adopt user-created Web content (Web 2.0) to generate online media data using the Netbase® online media listening, analytics, and intelligence platform (Netbase, 2023a). The platform uses natural language and information retrieval processing that analyzes text using machine learning algorithms. To develop a dataset encompassing online and social media posts referencing food fish and sport fish species and associated reports and outputs, we will construct inclusionary and exclusionary search terms and vocabulary associated with major NCR fish species - largemouth bass, yellow perch, walleye, bluegill, tilapia and rainbow trout. Search terms are intended to be general and broad. The machine learning techniques extract information in three levels a) feature or aspect level; b) document level; and c) sentence level.

Objective 2:

Sentiment analysis will identify and categorize opinions online in order to determine their sentiment towards a particular issue, fish in this case from 2014 to 2023. Online chatter is peoples’ opinion or view towards a topic therefore net sentiment will be constructed by comparing positive and negative posts to arrive at a single value/score that captures the positivity and negativity of various posts derived in the database search process (Netbase, 2023b). A sample of online media posts will be collected, categorizing the text in each post as either positive or negative sentiment. The positive or negative separation is assigned after identification of the opinion. The analysis can be in count of positive, negative, and neutral words and/or words are assigned a score from the dictionary of words. Each data point is scored as positive (+1), neutral (0) or negative (-1). A net sentiment score is then calculated by subtracting total negative posts from the total positive posts (Net Sentiment = positive terms – negative terms)- See Figure 2 below. In the Figure 2 example, there is no negative sentiment expressed in the text. Net sentiment can then be calculated as the total percentage of positive posts minus the percentage of negative posts, making it necessarily bounded between +100% and -100%. The neutral category of posts is employed when calculating and reporting on analytics for top words and other data summaries, but will not be used in the calculation of net sentiment in this project. Net sentiment is commonly used in the social media listening framework and the literature (Baj-Rogowska, 2020; Lappeman et al., 2022; Wase et al., 2018).

Figure 2: Example of Sentiment analysis



Objective 3:

This objective analyzes trends of sentiments over a number of years to assess trends in the responses of user-generated content and information. The dataset will be generated from 2014 through 2023 to help assess the dynamics in user perceptions over time. In particular, the period includes the Covid era and it has been reported that sales of seafood increased in the US during the time of COVID-19 (Engle et al., 2023). The period represents a significant change from one-time period that utilizes interview and/or survey methods and consumer reviews / reporting of perceptions or sentiments. Net sentiment, associated positive and negative impressions, total numbers of posts, mentions, and potential impressions will all provide insight into the scale and tone of online conversations around farmed food fishes and sport fishes.

Objective 4:

This objective will utilize the results from **Objectives 1 - 3** to help the aquaculture industry understand online media chatter with the assumption that online media posts adequately reflect consumer sentiments on farmed food fishes and sport fishes. It is assumed that consumers' mood and potential actions towards an issue such as aquaculture will depend on technology, trending media, and culture. The results from sentiment analysis will help to analyze and structure hidden information from online media to inform industry strategy. Therefore, recommendations will help industry to continually stay up-to-date on sentiments expressed through technology and online media.

Objective 5:

Outreach materials will be developed based on study results to improve the understanding of Americans' perceptions of farmed fishes. Outreach materials will focus on the aquaculture industry with crafted messages that connects the industry with technology, trending media, and culture. Outreach materials will include how the industry can respond to online comments, mentions, and direct messages to maximize positive interactions with online consumers while providing a quick resolution to any negative mentions. Industry's engagement on social sentiment will help play up the strengths of aquaculture and provide value for farmed fishes.

Outreach and Evaluation Plan

- a. Extension and outreach delivery format will be 2 in-person workshops (one each for food fish and sport fish), 2 webinars, and 2 Extension publication (one each for food fish and sport fish). Outreach will focus on guidelines for the aquaculture industry that can help connect the industry with online media technology, respond to trending issues, maximize positive interactions with online consumers, and play up the strengths of aquaculture to provide value for farmed fish. Incorporating both in-person and virtual presentations and online hands-on activities are more likely to lead to active learning by the audience.
- b. Target audience is aquaculture farmers – both food fish and sport fish, aquaculture industry communicators, extension agents, science writers with interest in aquaculture and seafood, aquaculture advocacy groups, and other industry stakeholders that utilize social media. This will involve collaboration with Great Lakes Sea Grant Extension network, Great Lakes States aquaculture associations, and University cooperative extension staff.
- c. Evaluation plan will be conducted with feedback from collaborators. For the in-person workshops, we will invite experts in social media analysis and adopt appropriate teaching and learning principles for the target audience. Feedback from target audience will assess clarity of materials presented, feasibility of recommendations, and adoption of hands-on experience. Ultimately, the target audience will have an understanding of responsiveness to consumer sentiments. The extension publication material will be evaluated for their likelihood of being impactful to the target audience.
- d. Outreach audience will be evaluated using pre- and post-tests that assess effectiveness of workshops using Likert-type scale response anchors to judge several factors - industry priorities and importance level of various factors, among others. This baseline and post-instructional feedback will help understand the level of comprehension by the audience, the comfort level and optimism of the topics, and the likelihood of the audience adopting the learned materials in their own business.

Logic Model

Situation: Big data analytics such as sentiment analysis is used by industries to identify mood or opinion of people’s own written views to inform marketing campaigns, measure product performance, and/or track sentiment toward a brand, company, or industry. This tool will benefit the NCR aquaculture industry by providing valuable insights into consumer / customer mood, perceptions and potential demand signals associated with major NCR fishes.

Goal: A responsive NCR aquaculture industry making appropriate, feasible, and accurate strategic choices; understanding market demand drivers; identifying areas for improvement and developing targeted interventions to address customer concerns.

Inputs	Outputs		Outcomes / Impacts	
	Activities & Deliverables	Knowledge Gain	Behavior Change	Conditions
<p>Personnel:</p> <ul style="list-style-type: none"> • Research and extension faculty and staff at Purdue Univ. • Ohio Sea Grant Extension staff, Ohio State Univ. <p>Resources:</p> <ul style="list-style-type: none"> • NCRAC funds • Netbase® software • Computing equipment • Staff time 	<ul style="list-style-type: none"> • Project management - initiate sub-award • Literature review • Purchase Netbase® license. • Construct dataset and collect data. • Conduct quantitative analysis of online sentiments of consumers. • Categorize online contents and highlight patterns in sentiments. • Report on public sentiment. • Detailed analysis of sentiment fluctuations. • Design & implement specific intervention strategies for industry. • Two in-person workshops (food fish and sport fish). • Develop outreach brochures. • Evaluate industry responsiveness to online chatter. 	<ul style="list-style-type: none"> • Insights into perceptions by researchers to gauge public opinion and attitudes. • Industry understanding and assessing market demand for the species. • Industry identifying areas for improvement and developing targeted interventions to address customer concerns. 	<ul style="list-style-type: none"> • Aquaculture industry continually monitor net sentiment to control and manage reputation. • Aquaculture industry track sentiment over time. • Industry effectively identifies potential issues, complaints, or negative trends that could harm the industry as a whole. • Industry promptly addressing online concerns. • Engaging customers to maintain a positive reputation and build trust in the aquaculture industry. • Policy makers and regulatory bodies shape policies, regulations, and guidelines that consider customer satisfaction and address concerns. • Policymakers make informed decisions that promote the aquaculture growth, safeguarding environmental sustainability and public satisfaction. 	<ul style="list-style-type: none"> • Sentiment analysis is consistent with assessing consumer preferences. • Effective responsiveness results in new markets for aquaculture products. • New products entering the market that may have previously been contentious. • Aquaculture products becoming more accepted in the marketplace. • Continue sentiment analysis as an ongoing process for the industry.

<p>Assumptions:</p> <ul style="list-style-type: none"> • Online sentiments reflect the true views and opinions of online users. • Sentiment analysis is consistent with assessing consumer preferences. • Sentiment analysis is a tool for discovering and/or improving customer needs. 	<p>External Factors:</p> <ul style="list-style-type: none"> • Social media data has some challenges – words lose its translation, noise and unstructured texts (spelling errors, slang, abbreviations, emojis, hashtags), sarcasm, types of negations, word ambiguity, multipolarity, etc.
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Facilities

Purdue University has the computing capacity for sentiment analysis as a multidisciplinary field to accomplish the computer-intensive extraction of online feature or aspect, document, and sentence levels. Computational capacity adopts lexicon- and machine learning -based techniques that extracts sentences and aspect levels from online chatter. This project requires subscription to the computer-intensive NetBase® artificial intelligence-powered consumer and market intelligence algorithms that enable businesses reinvent in the current digital world.

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Project Leaders

State	Name / Institution	Area of Specialization
Indiana	Kwamena Quagraine, Purdue University	Economics and marketing
Indiana	Amy Shambach, Purdue University	Outreach and extension
Ohio	Nicole Wright, Ohio State University	Extension, learning and education

BUDGET: Purdue University – Year 1

ORGANIZATION AND ADDRESS Purdue University Sponsored Program Services 2550 Northwestern Ave Suite 1900, West Lafayette, IN 47906			USDA AWARD NO. Year 1: Objectives 1 - 3			
			Duration Proposed Months: <u>12</u> Funds Requested by Proposer	Duration Proposed Months: _____ Funds Approved by CSREES (If different)	Non-Federal Proposed Cost-Sharing/Matching Funds (If required)	Non-federal Cost-Sharing/Matching Funds Approved by CSREES (If Different)
PROJECT DIRECTOR(S) Kwamena Quagrainie						
A. Salaries and Wages 1. No. of Senior Personnel			CSREES FUNDED WORK MONTHS			
			Calendar	Academic	Summer	
a. ___ (Co)-PD(s) b. ___ Senior Associates						
2. No. of Other Personnel (Non-Faculty) a. ___ Research Associates-Postdoctorates . . . b. 1 Other Professionals			10.56	X		53,460
c. Paraprofessionals d. ___ Graduate Students e. Prebaccalaureate Students f. Secretarial-Clerical g. Technical, Shop and Other Total Salaries and Wages →						53,460
B. Fringe Benefits (If charged as Direct Costs)						16,802
C. Total Salaries, Wages, and Fringe Benefits (A plus B) →						70,262
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)						
E. Materials and Supplies						8,000
F. Travel						4,650
G. Publication Costs/Page Charges						
H. Computer (ADPE) Costs						
I. Student Assistance/Support (Scholarships/fellowships, stipends/tuition, cost of education, etc. Attach list of items and dollar amounts for each item.)						
J. All Other Direct Costs (In budget narrative, list items and dollar amounts and provide supporting data for each item.)						
K. Total Direct Costs (C through J) →						12,650
L. F&A/Indirect Costs. (If applicable, specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs in on/off campus bases.)						0.00
M. Total Direct and F&A/Indirect Costs (J plus K) . →						82,912
N. Other →						
O. Total Amount of This Request →						82,912
P. Carryover -- (If Applicable) Federal Funds: \$82,912 Non-Federal funds: \$ Total \$82,912						
Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O) Cash (both Applicant and Third Party) → Non-Cash Contributions (both Applicant and Third Party) →						
NAME AND TITLE (Type or print)	SIGNATURE (required for revised budget only)				DATE	
Project Director						
Authorized Organizational Representative						
Signature (for optional use)						

BUDGET: Purdue University – Year 2

ORGANIZATION AND ADDRESS Purdue University Sponsored Program Services 2550 Northwestern Ave Suite 1900, West Lafayette, IN 47906				USDA AWARD NO. Year 2: Objectives 3, 4 & 5				
				Duration Proposed Months: <u>12</u> Funds Requested by Proposer	Duration Proposed Months: _____ Funds Approved by CSREES (If different)	Non-Federal Proposed Cost-Sharing/Matching Funds (If required)	Non-federal Cost-Sharing/Matching Funds Approved by CSREES (If Different)	
PROJECT DIRECTOR(S) Kwamena Quagrainie								
A. Salaries and Wages 1. No. of Senior Personnel		CSREES FUNDED WORK MONTHS						
		Calendar	Academic	Summer				
a. ___ (Co)-PD(s) b. ___ Senior Associates								
2. No. of Other Personnel (Non-Faculty) a. ___ Research Associates-Postdoctorates ... b. 1 Other Professionals		10.56	X		54,797			
c. Paraprofessionals d. ___ Graduate Students e. Prebaccalaureate Students f. Secretarial-Clerical g. Technical, Shop and Other Total Salaries and Wages →					54,797			
B. Fringe Benefits (If charged as Direct Costs)				17,222				
C. Total Salaries, Wages, and Fringe Benefits (A plus B) →				72,019				
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)								
E. Materials and Supplies				12,240				
F. Travel				3,650				
G. Publication Costs/Page Charges								
H. Computer (ADPE) Costs								
I. Student Assistance/Support (Scholarships/fellowships, stipends/tuition, cost of education, etc. Attach list of items and dollar amounts for each item.)								
J. All Other Direct Costs (In budget narrative, list items and dollar amounts and provide supporting data for each item.)				22,630				
K.....Total Direct Costs (C through I) →				38,520				
L. F&A/Indirect Costs. (If applicable, specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs in on/off campus bases.)				0.00				
M..... Total Direct and F&A/Indirect Costs (J plus K) . →				110,539				
N..... Other →								
O.....Total Amount of This Request →				110,539				
P. Carryover -- (If Applicable) Federal Funds: \$110,539				Non-Federal funds: \$	Total \$110,539			
Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O) Cash (both Applicant and Third Party)→ Non-Cash Contributions (both Applicant and Third Party) →								
NAME AND TITLE (Type or print)		SIGNATURE (required for revised budget only)				DATE		
Project Director								
Authorized Organizational Representative								
Signature (for optional use)								

BUDGET: Purdue University – Total (Yrs 1 & 2)

ORGANIZATION AND ADDRESS Purdue University Sponsored Program Services 2550 Northwestern Ave Suite 1900, West Lafayette, IN 47906				USDA AWARD NO. Year 1 & 2: Objectives 1, 2, 3, 4 & 5			
PROJECT DIRECTOR(S) Kwamena Quagrainie				Duration Proposed Months: 24	Duration Proposed Months: _____	Non-Federal Proposed Cost-Sharing/Matching Funds (If required)	Non-federal Cost-Sharing/Matching Funds Approved by CSREES (If Different)
A. Salaries and Wages				Funds Requested by Proposer	Funds Approved by CSREES (If different)		
1. No. of Senior Personnel							
CSREES FUNDED WORK MONTHS							
				Calendar	Academic	Summer	
a. ___ (Co)-PD(s)							
b. ___ Senior Associates							
2. No. of Other Personnel (Non-Faculty)							
a. ___ Research Associates-Postdoctorates . . .							
b. 1 Other Professionals				21.12	X		
c. Paraprofessionals							
d. ___ Graduate Students							
e. Prebaccalaureate Students							
f. Secretarial-Clerical							
g. Technical, Shop and Other							
Total Salaries and Wages							
				108,257			
c. Paraprofessionals							
d. ___ Graduate Students							
e. Prebaccalaureate Students							
f. Secretarial-Clerical							
g. Technical, Shop and Other							
Total Salaries and Wages				118,257			
B. Fringe Benefits (If charged as Direct Costs)				34,025			
C. Total Salaries, Wages, and Fringe Benefits (A plus B) →				142,282			
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)							
E. Materials and Supplies				20240			
F. Travel				8,300			
G. Publication Costs/Page Charges							
H. Computer (ADPE) Costs							
I. Student Assistance/Support (Scholarships/fellowships, stipends/tuition, cost of education, etc. Attach list of items and dollar amounts for each item.)							
J. All Other Direct Costs (In budget narrative, list items and dollar amounts and provide supporting data for each item.)				22630			
K. Total Direct Costs (C through I) →				51,170			
L. F&A/Indirect Costs. (If applicable, specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs in on/off campus bases.)				0.00			
M. Total Direct and F&A/Indirect Costs (J plus K) . →				193,452			
N. Other →							
O. Total Amount of This Request →				193,452			
P. Carryover -- (If Applicable) Federal Funds: \$193,452				Non-Federal funds: \$	Total \$193,452		
Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)							
Cash (both Applicant and Third Party)							
Non-Cash Contributions (both Applicant and Third Party) →							
NAME AND TITLE (Type or print)				SIGNATURE (required for revised budget only)			DATE
Project Director							
Authorized Organizational Representative							
Signature (for optional use)							

Budget Explanation (Purdue University)

In accordance with 2 CFR 200, Uniform Administrative Requirements, Cost Principles, And Audit Requirements for Federal Awards, Purdue University tracks and reports its professional personnel on a percent of effort and not on an hourly basis. Salaries are adjusted by standard University inflation rates each fiscal year (July 1): 3% for faculty, 2.5% for professional/technical assistants, and 2% for post docs, graduate/undergraduate students and service staff. Purdue University defines the term “year” as the university fiscal year (July-June) for purposes of the NSF Limitation on salary compensation for senior personnel

Personnel: Salaries & Wages

Year 1: \$53,460

A Research Associate (TBD) will be supported on this project for 0.88 FTE with \$53,460 salary. This position is grant-funded with the main responsibility of utilizing the Netbase online platform to gather media listening using natural language processing and machine learning algorithms. He/she will develop a dataset encompassing online and social media posts referencing food fish and sport fish species and associated reports and outputs, and construct inclusionary and exclusionary search terms associated with major US North Central fish species. The Research Associate will work under the supervision of Dr. Quagrairie and will be responsible for Objectives 1, 2, and 3.

Fringe Benefits \$16,802 - Fringe benefits are budgeted in accordance with university policy as follows: Research Associate (TBD) 31.43% = \$16,802.

Year 2: \$54,797

A Research Associate (TBD) will be supported on this project for 0.88 FTE in Year 2 with \$54,797 salary. This position is grant-funded with the main responsibility of analysis of the data both qualitatively and quantitatively. He/she will also assist in developing and delivering the regional aquaculture extension program and outreach materials as described in Objectives 4 and 5 and Outreach and Evaluation Plan. The Associate will work under the supervision of Dr. Quagrairie and will be responsible for Objectives 3, 4 and 5.

Fringe Benefits \$17,223 - Fringe benefits are budgeted in accordance with university policy as follows: Research Associate (TBD) 31.43% = \$17,223.

Materials and Supplies:

Year 1:

\$8,000 is budgeted for Software for analysis - This is the subscription cost for the NetBase® Platform.

Year 2:

We request \$2,000 to cover materials and supplies needed to run extension programming, including cost of partial lease of a computer and projector, and other related printable costs and supplies.

Domestic Travel:

Year 1:

\$4,650 budgeted for domestic travel for project personnel includes a cumulative mileage of 1,000 miles @ \$0.65 (\$650), and cumulative 20 days overnight stays @ \$100 for 2 project personnel (\$4,000).

Year 2:

Budgeted \$3,650 for domestic travel for project personnel includes a cumulative mileage of 1,000 miles @ \$0.65 (\$650), and cumulative 10 days overnight stays @ \$150 for 2 project personnel (\$3,000).

All Other Direct Costs:

Year 1: \$0

Year 2:

We request \$10,240 to cover the cost for one of the two projects in-person trainings and closed caption fees. The costs include \$300 for light refreshments (30 people @ \$10/per person); \$540 lunch meal (30 people @ \$18.00/person); \$400 stipends for invited speakers (2 speakers @ \$200/expert) to present social media analysis and techniques for use by aquaculture business owners at in-person workshop; \$3000 for 2 guest speakers/experts @ \$1500/each to cover travel, lodging, and per diem; \$1,000 for development of webinar content transcription services; \$5,000 for the services of a graphic designer to develop and design outreach materials - brochures.

Subcontract:

Ohio State University (OSU)

Year 1: \$0.00

Year 2: (\$22,630)

OSU will be assisting on assessing implications of online media chatter data for the U.S. aquaculture industry and also assisting in developing outreach materials based on results to improve the understanding of Americans' perceptions of farmed fish from online chatter.

Indirect Costs:

There was no indirect cost budgeted per sponsor regulation. Purdue's indirect rate is at the negotiated at the rate of 57% of the modified total direct costs for research. This rate was approved on 10/03/2022 by the Department of Health and Human Services (POC: DHHS, Steven Zuraf, 301-492-4858).

BUDGET: Ohio State University – Year 1

ORGANIZATION AND ADDRESS The Ohio State University, Mount Hall 1050 Carmack Road Columbus, OH 43210				USDA AWARD NO. Year 1				
				Duration Proposed Months: <u>12</u> Funds Requested by Proposer	Duration Proposed Months: _____ Funds Approved by CSREES (If different)	Non-Federal Proposed Cost-Sharing/Matching Funds (If required)	Non-federal Cost-Sharing/Matching Funds Approved by CSREES (If Different)	
PROJECT DIRECTOR(S) Nicole Wright								
A. Salaries and Wages 1. No. of Senior Personnel		CSREES FUNDED WORK MONTHS						
		Calendar	Academic	Summer				
a. <u>1</u> (Co)-PD(s)								
b. ___ Senior Associates								
2. No. of Other Personnel (Non-Faculty)								
a. ___ Research Associates-Postdoctorates ...								
b. Other Professionals								
c. Paraprofessionals								
d. Graduate Students								
e. Prebaccalaureate Students								
f. Secretarial-Clerical								
g. Technical, Shop and Other								
Total Salaries and Wages →								
B. Fringe Benefits (If charged as Direct Costs)								
C. Total Salaries, Wages, and Fringe Benefits (A plus B) →								
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)								
E. Materials and Supplies								
F. Travel								
G. Publication Costs/Page Charges								
H. Computer (ADPE) Costs								
I. Student Assistance/Support (Scholarships/fellowships, stipends/tuition, cost of education, etc. Attach list of items and dollar amounts for each item.)								
J. All Other Direct Costs (In budget narrative, list items and dollar amounts and provide supporting data for each item.)								
K.....Total Direct Costs (C through I) →								
L. F&A/Indirect Costs. (If applicable, specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs in on/off campus bases.)								
M..... Total Direct and F&A/Indirect Costs (J plus K) . →								
N.....Other →								
O.....Total Amount of This Request →								
P. Carryover -- (If Applicable) Federal Funds:				Non-Federal funds: \$		Total		
Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)								
Cash (both Applicant and Third Party) →								
Non-Cash Contributions (both Applicant and Third Party) →								
NAME AND TITLE (Type or print)		SIGNATURE (required for revised budget only)				DATE		
Project Director								
Authorized Organizational Representative								
Signature (for optional use)								

BUDGET: Ohio State University – Year 2

ORGANIZATION AND ADDRESS The Ohio State University, Mount Hall 1050 Carmack Road Columbus, OH 43210				USDA AWARD NO. Year 2: Objective 5					
				Duration Proposed Months: <u>12</u> Funds Requested by Proposer	Duration Proposed Months: _____ Funds Approved by CSREES (If different)	Non-Federal Proposed Cost-Sharing/Matching Funds (If required)	Non-federal Cost-Sharing/Matching Funds Approved by CSREES (If Different)		
PROJECT DIRECTOR(S) Nicole Wright									
A. Salaries and Wages 1. No. of Senior Personnel a. <u>1</u> (Co)-PD(s) b. ___ Senior Associates		CSREES FUNDED WORK MONTHS			12,500				
		Calendar	Academic	Summer					X
2. No. of Other Personnel (Non-Faculty) a. ___ Research Associates-Postdoctorates ... b. ___ Other Professionals									
c. Paraprofessionals d. Graduate Students e. Prebaccalaureate Students f. Secretarial-Clerical g. Technical, Shop and Other Total Salaries and Wages →					12,500				
B. Fringe Benefits (If charged as Direct Costs)					4,450				
C. Total Salaries, Wages, and Fringe Benefits (A plus B) →					16,950				
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)									
E. Materials and Supplies					100				
F. Travel					3,940				
G. Publication Costs/Page Charges									
H. Computer (ADPE) Costs									
I. Student Assistance/Support (Scholarships/fellowships, stipends/tuition, cost of education, etc. Attach list of items and dollar amounts for each item.)									
J. All Other Direct Costs (In budget narrative, list items and dollar amounts and provide supporting data for each item.)					1,640				
K.....Total Direct Costs (C through I) →					5,680				
L. F&A/Indirect Costs. (If applicable, specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs in on/off campus bases.)					0.00				
M..... Total Direct and F&A/Indirect Costs (J plus K) . →					22,630				
N.....Other →									
O.....Total Amount of This Request →					22,630				
P. Carryover -- (If Applicable) Federal Funds: \$22,630		Non-Federal funds: \$		Total \$22,630					
Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O) Cash (both Applicant and Third Party) → Non-Cash Contributions (both Applicant and Third Party) →									
NAME AND TITLE (Type or print)		SIGNATURE (required for revised budget only)						DATE	
Project Director									
Authorized Organizational Representative									
Signature (for optional use)									

BUDGET: Ohio State University – Total (Yrs 1 & 2)

ORGANIZATION AND ADDRESS The Ohio State University, Mount Hall 1050 Carmack Road Columbus, OH 43210				USDA AWARD NO. Year 1 & 2: Objective 5								
PROJECT DIRECTOR(S) Nicole Wright				Duration Proposed Months: 24	Duration Proposed Months: _____	Non-Federal Proposed Cost-Sharing/Matching Funds (If required)	Non-federal Cost-Sharing/Matching Funds Approved by CSREES (If Different)					
A. Salaries and Wages				Funds Requested by Proposer	Funds Approved by CSREES (If different)							
1. No. of Senior Personnel												
CSREES FUNDED WORK MONTHS				12,500								
<table border="1"> <tr> <td>Calendar</td> <td>Academic</td> <td>Summer</td> </tr> <tr> <td>a. <u> 1 </u> (Co)-PD(s)</td> <td align="center">X</td> <td></td> </tr> <tr> <td>b. <u> </u> Senior Associates</td> <td></td> <td></td> </tr> </table>								Calendar	Academic	Summer	a. <u> 1 </u> (Co)-PD(s)	X
Calendar	Academic	Summer										
a. <u> 1 </u> (Co)-PD(s)	X											
b. <u> </u> Senior Associates												
2. No. of Other Personnel (Non-Faculty)												
a. <u> </u> Research Associates-Postdoctorates . . .												
b. <u> </u> Other Professionals												
c. Paraprofessionals												
d. Graduate Students												
e. Prebaccalaureate Students												
f. Secretarial-Clerical												
g. Technical, Shop and Other												
Total Salaries and Wages →				12,500								
B. Fringe Benefits (If charged as Direct Costs)				4,450								
C. Total Salaries, Wages, and Fringe Benefits (A plus B) →				16,950								
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)												
E. Materials and Supplies				100								
F. Travel				3,940								
G. Publication Costs/Page Charges												
H. Computer (ADPE) Costs												
I. Student Assistance/Support (Scholarships/fellowships, stipends/tuition, cost of education, etc. Attach list of items and dollar amounts for each item.)												
J. All Other Direct Costs (In budget narrative, list items and dollar amounts and provide supporting data for each item.)				1,640								
K. Total Direct Costs (C through I) →				5,680								
L. F&A/Indirect Costs. (If applicable, specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs in on/off campus bases.)				0.00								
M. Total Direct and F&A/Indirect Costs (J plus K) . →				22,630								
N. Other →												
O. Total Amount of This Request →				22,630								
P. Carryover -- (If Applicable) Federal Funds: 22,630 Non-Federal funds: \$ Total \$22,630												
Q. Cost Sharing/Matching (Breakdown of total amounts shown in line O)												
Cash (both Applicant and Third Party) →												
Non-Cash Contributions (both Applicant and Third Party) →												
NAME AND TITLE (Type or print)				SIGNATURE (required for revised budget only)		DATE						
Project Director												
Authorized Organizational Representative												
Signature (for optional use)												

The Ohio State University

Yr 1: \$0

Yr 2: \$22,630.00

Salaries, Wages, and Fringe Benefits: \$16,950.00

We are requesting 2.5 months of salary (\$12,500) and fringe benefits (\$4,450) for Ohio Sea Grant Aquaculture Extension Specialist Nicole Wright to work on Objective 5, including outreach activities and evaluation, including contribution and review of extension publication, webinar planning and production, and in-person workshop planning and delivery.

Fringe benefits calculated at the rate of 35.6% for A&P staff in accordance with University policy.

Nonexpendable Equipment: \$0

None

Materials and Supplies: \$100

We are requesting \$100 for workshop supplies including but not limited to printed materials, pens, folders, name tags, paper, markers, etc.

Travel: \$3,940

We are requesting a total of \$640 for staff travel for in-person workshops:

\$180 in mileage for staff travel to/from one Columbus, OH in-person workshop at approx. 275 miles at \$0.655/mile.

\$460 in mileage for staff travel to/from one West Lafayette, IN in-person workshop at approx. 700 miles at \$0.655/mile.

We are requesting \$300 in lodging for 2-night stay in West Lafayette, IN for in-person workshop.

We are requesting \$3000 for (2) guest speakers/experts @ \$1500/each to cover travel, lodging, and per diem.

All Other Direct Costs: \$1,640

Light refreshments and lunches: We are requesting \$210 for light refreshments (coffee, fruit, snacks) @ \$7/person for 30 people. We are requesting \$540 for lunches @\$18 for 30 people.

Meeting room rental: We are requesting \$175 for 4-8 hours of meeting room space with free parking in Columbus, OH.

Transcription services: We are requesting \$315 for 3.5 hours of webinar content transcription services @\$1.50/minute.

Stipends for (2) guest speakers/experts: We are requesting \$400 for stipends @\$200/expert to present social media analysis and techniques for use by aquaculture business owners at in-person workshop.

Total: \$22,630

Proposed Summary Budget for Year 1

For All Participating Institutions (additional budget pages should be prepared for each year of proposed budget)

	Objective #	Purdue University (Kwamena Quagraine, Amy Shambach)	Ohio State University (Nicole Wright)	Project Total
Salaries, Wages, and Fringe Benefits	1, 2, 3	\$70,262		\$70,262
Nonexpendable Equipment				
Materials and Supplies	1, 2, 3	\$8,000		\$8,000
Travel	1, 2, 3	\$4,650		\$4,650
All Other Direct Costs				
Total		\$82,912		\$82,912

Proposed Summary Budget for Year 2

	Objective #	Purdue University (Kwamena Quagraine, Amy Shambach)	Ohio State University (Nicole Wright)	Project Total
Salaries, Wages, and Fringe Benefits	4, 5	\$72,019	\$16,950	\$88,969
Nonexpendable Equipment				
Materials and Supplies	4, 5	\$2,000	\$100	\$2,100
Travel	4, 5	\$3,650	\$3,940	\$7,590
All Other Direct Costs	5	\$10,240	\$1,640	\$11,880
		\$87,909	\$22,630	\$110,539

Proposed Summary Budget for Years 1 & 2 (Total)

	Objective #	Purdue University (Kwamena Quagraine, Amy Shambach)	Ohio State University (Nicole Wright)	Project Total
Salaries, Wages, and Fringe Benefits	1, 2, 3, 4, 5	\$142,282	\$16,950	\$159,232
Nonexpendable Equipment		\$0		
Materials and Supplies	1, 2, 3, 4, 5	\$10,000	\$100	\$10,100
Travel	1, 2, 3, 4, 5	\$8,300	\$3,940	\$12,240
All Other Direct Costs	5	\$10,240	\$1,640	\$11,880
Total		\$170,822	\$22,630	\$193,452

Schedule for Completion of Objectives

Start date: 01/01/2024

Completion date: 12/31/2025

Objectives & Tasks	Year 1						Year 2					
	Jan Feb	Mar Apr	May Jun	Jul Aug	Sep Oct	Nov Dec	Jan Feb	Mar Apr	May Jun	Jul Aug	Sep Oct	Nov Dec
Objective 1:												
Task 1: - Review relevant literature & purchase Netbase® license. - Initiate sub-award to Ohio State University.												
Task 2: Develop a dataset, construct inclusionary and exclusionary search terms and vocabulary.												
Objective 2:												
Task: - Construct net sentiments comparing positive and negative posts to arrive at a single value/score that captures the positivity and negativity.												
Objective 3:												
Task: - Perform analysis of trends in the responses of user-generated content and information.												
Objective 4:												
Task: - Conduct in-person workshops (food fish and sport fish), focusing connecting the industry with online media technology and responding to trending issues.												
Objective 5:												
Task: - Develop outreach materials based on study results to improve the understanding of Americans' perceptions of farmed fishes and how industry can engagement on social sentiments.												
Delivery												
Task: - Publish outreach materials via appropriate channels including Extension online outlets, & social media platforms.												

List of Principal Investigators per Institution

Quagraine, Kwamena	Purdue University
Shambach, Amy	Purdue University
Wright, Nicole	Ohio State University

Data Management Plan

Expected Data Type

Describe the type of data (e.g., digital, non-digital), how it will be generated, and whether the data are primary or metadata. Research examples include: lab work, field work and surveys; Education examples include: number of students enrolled/participated, degrees granted, curriculum, and training products; Extension examples include: outreach materials, number of stakeholders reached, number of activities, and assessment questionnaires

Data type will be online text collected from different online chat platforms. Data collected will national as well as disaggregated from various census regions. This data will be both qualitative and quantitative to be used for the sentiment analysis.

Data format

For scientific data to be readily accessible and usable it is critical to use appropriate community-recognized standard and machine readable formats when they exist. If the data will be managed in domain-specific workspaces or submitted to public databases, indicate that their required formats will be followed. Regardless of the format used, the data set must contain enough information to allow independent use (understanding, validation, and analysis) of the data

The data will be both qualitative and quantitative in Microsoft Word and Excel format.

Data storage and preservation

Data must be stored in a safe environment with adequate measures taken for its long-term preservation. Applicants must describe plans for storing and preserving their data during and after the project and specify the data repositories, if they exist. Databases or data repositories for long-term preservation may be the same that are used to provide Data Sharing and Public Access. Estimate how much data will be preserved and state the planned retention period. Include any strategies, tools, and contingency plans that will be used to avoid data loss, degradation, or damage

All the data collected will be stored at Purdue University Research Repository. Since this study involves a online data and text mining, we will obtain a very large dataset and access will be provided to the public through Purdue University's repository. The data will be in the repository for 10 years.

Data sharing, protection, and public access

Describe your data access and sharing procedures during and after the grant. Name specific repositories and catalogs as appropriate. Include a statement, when applicable, of plans to protect confidentiality, personal privacy, proprietary interests, business confidential information, and intellectual property rights. Outline any restrictions such as copyright, confidentiality, patent, appropriate credit, disclaimers, or conditions for use of the data by other parties.

All the data collected will be stored at Purdue University Research Repository. Both qualitative and quantitative will be available through Purdue University's repository. There will be no restrictions to access the data derived from the project. Data will be aggregated.

Roles and responsibilities

Who will ensure DMP implementation? This is particularly important for multi-investigator and multi-institutional projects. Provide a contingency plan in case key personnel leave the project. Also, what resources will be needed for the DMP? If funds are needed, have they been added to the budget request and budget narrative? Projects must budget sufficient resources to develop and implement the proposed DMP.

Lead PI, Kwamena Quagraine will ensure the implementation of the DMP.

Kwamena K. Quagraine

Department of Agricultural Economics / Illinois-Indiana Sea Grant
Purdue University, 403 West State Street, West Lafayette, IN 47907
Tel: 765-494-4200 | kquagrai@purdue.edu

Present Position

Aquaculture Economics & Marketing Professor / Extension Specialist

Education

Ph.D., Agricultural Economics, University of Alberta, Canada

M.S., Agricultural Economics, University of Alberta, Canada

B.S., Agriculture, University of Science and Technology, Ghana

Selected Research / Scholarly Publications

1. Carlton, J. S., Shambach, A. M., & Quagraine, K. (2023). Aquaculture Extension Capacity in the USDA North-Central Region: Results from a Survey. *Journal of Human Sciences and Extension*, 11(1), 13.
2. Quagraine, K., de Souza, S. V., Athnos, A., Etumnu, C., Knudson, W., Kinnunen, R., & Hitchens, P. (2022). The seafood basket: Application of zero-inflated model to fish count purchase. *Aquaculture*.
3. Athnos, A., Valle de Souza, S., Quagraine, K., Etumnu, C., Knudson, W., Kinnunen, R., & Hitchens, P.. Are U.S. consumers willing to pay more by the lake? An analysis of preferences for Great Lakes region fish. *Agricultural and Resource Economics Review*, 1-26, 2022.
4. Flores, R. M. V., Preckel, P. V., Quagraine, K. K., Widmar, N. O., Silva, L., da Costa, J. I., Pinho, S. M., Portella, M. C., Branco, T. C., and Filho, M. X. P. Efficiency tests for screening production strategies in a lettuce-juvenile tilapia aquaponics system in Brazil. *Aquaculture International*, 1-22, 2022.
5. Pinho, S. M., Flores, R. M. V., David, L. H., Emerenciano, M. G., Quagraine, K. K., and Portella, M. C. Economic comparison between conventional aquaponics and FLOCponics systems. *Aquaculture*, 552(15); 737987. 2022.
6. Flores, R. M. V., Widmar, N. O., Quagraine, K., Preckel, P. V., & Pedroza Filho, M. X. Establishing Linkages Between Consumer Fish Knowledge and Demand for Fillet Attributes in Brazilian Supermarkets. *Journal of International Food & Agribusiness Marketing*, 1-21, 2021.
7. Akuffo, A.S., Quagraine, K.K., and Obirikorang, K.A. Analysis of the determinants of fish consumption by households in Ghana. *Aquaculture Economics & Management*, 24(3); 294-309, 2020.
8. Chenyambuga, S. W., Munubi, R. S., Madalla, N. A., Quagraine, K., Frimpong, E., and Egna, H. Effects of Fertilization and Concentrate Feeding on Water Quality and Growth Performance of Nile Tilapia (*Oreochromis niloticus*) Grown in Concrete Tanks. *African Journal of Biological Sciences*, 2(4), 65-72, 2020.
9. Akuffo, A.S., and Quagraine, K.K. Assessment of household food security in fish farming communities in Ghana. *Sustainability*, 11(10); 2807, 2019.
10. Quagraine, K.K. Consumer Willingness to Pay for a Saline Fish Species Grown in the US Midwest: The Case of Striped Bass, *Morone saxatilis*. *Journal of the World Aquaculture Society*. 50(1); 163-171, 2019.
11. Amankwah, A., and Quagraine, K.K. Aquaculture Feed Technology Adoption and Smallholder Household Welfare in Ghana. *Journal of the World Aquaculture Society*. 50 (4):827-841, 2019.
12. Quagraine, K.K., and Chu, J. Determinants of Catch Sales in Ghanaian Artisanal Fisheries. *Sustainability*. 11(2); 298, 2019.
13. Quagraine, K.K., Flores, R.M.V., Kim, Hye-Ji, and McClain, V. Economic Analysis of Aquaponics and Hydroponics Production in the U.S. Midwest, *Journal of Applied Aquaculture*. 30(1); 1-14, 2018.
14. Amankwah, A., Quagraine, K.K., and Preckel, P.V. Impact of Aquaculture Feed Technology on Fish Income and Poverty in Kenya. *Aquaculture Economics & Management*. 22(4); 410-430, 2018.
15. Amankwah, A., Quagraine, K.K., and Preckel, P.V. Demand for Improved Fish Feed in the Presence of a Subsidy: A Double Hurdle Application in Kenya. *Agricultural Economics*. 47(6); 633-643, 2016.
16. Darko, F.A., Quagraine, K.K., and Chenyambuga, S. Consumer Preferences for Farmed Tilapia in Tanzania: A Choice Experiment Analysis. *Journal of Applied Aquaculture* 28(3); 131-143, 2016.
17. Anane-Taabeah, G., Quagraine, K.K., and Amisah, S. Assessment of Farmed Tilapia Value Chain in Ghana. *Aquaculture International*, 24, 903–919, 2016.
18. Ndanga, L.Z.B., Quagraine, K.K., Ngugi, C.C., and Amadiva, J. An Application of Porter's Framework to Assess Aquaculture Value Chain in Kenya. *African Journal of Food, Agriculture, Nutrition and Development*. 15(3); 10118–10137, 2015.

Amy Shambach

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195 Marsteller Street, Forestry, Lafayette, IN 47907-2033 E-mail: ashambac@purdue.edu

Education

A.A., A.S. College of the Redwoods, 2002, Science and Mathematics, Marine Science Technology
B.S. Ball State University, 2010, Biology

Position

2019 – present Aquaculture Marketing Outreach Association, Illinois-Indiana Sea Grant, Purdue University, Indiana
Oct. 2014 – 2019 Aquaculture Lab Technician, RDM Aquaculture LLC, Indiana
Aug. 2014 – Oct. 2014 Consultant, Aqua International Corporation, Costa Rica
Jan. 2014 - Aug. 2014 Compliance and Certification Coordinator, Bell Aquaculture, Indiana
2012 – 2013 Farm Manager, Bell Aquaculture, Indiana
2010 - 2012 Analytical Research Coordinator, Bell Aquaculture, Indiana
2010 Undergraduate Intern, Oregon State University, Oregon

Scientific and Professional Organizations

- Indiana Aquaculture Association Inc. (2015-present)
- North Central Regional Aquaculture Center (2015-present)
- Southern Illinois Aquaculture Association (2022-present)
- Ohio Aquaculture Association (2023)
- US Aquaculture Society | World Aquaculture Society (2023)

Selected Publications

1. Carlton, J., Shambach, A. M., & Quagraine, K. (2023). Aquaculture Extension Capacity in the USDA North-Central Region: Results from a Survey. *Journal of Human Sciences and Extension*, 11(1), 13.
DOI: <https://doi.org/10.55533/2325-5226.1385>
2. Shambach, Amy. 2023. Atlantic Salmon farmed fish fact sheet. Illinois-Indiana Sea Grant Fact Sheet: IISG22-SFA-BRC-021. <https://iiseagrant.org/publications/atlantic-salmon-farmed-fish-fact-sheet/>.
3. Quagraine, K., Shambach, A. 2022. A Guide to Small-Scale Fish Processing Using Local Kitchen Facilities. Illinois-Indiana Sea Grant Report: IISG22-SAF-BRC-012. <https://iiseagrant.org/publications/a-guide-to-small-scale-fish-processing-using-local-kitchen-facilities/>
4. Shambach, Amy. 2022. Channel catfish farmed fish fact sheet. Illinois-Indiana Sea Grant Fact Sheet: IISG21-SFA-BRC-054. <https://iiseagrant.org/publications/channel-catfish-farmed-fish-fact-sheet/>
5. Quagraine, K., Shambach, A. 2021. Aquaculture Markets in the 21st Century. Choices. Accessible: <https://www.choicesmagazine.org/choices-magazine/theme-articles/the-economics-of-us-aquaculture/aquaculture-markets-in-the-twenty-first-century>
6. Carlton, C., Shambach, A., Hartenstine, H., 2021. Voices from the Industry: Aquaculture Producers in the Midwestern United States. Choices. Accessible: <https://www.choicesmagazine.org/choices-magazine/theme-articles/the-economics-of-us-aquaculture/voices-from-the-industry-aquaculture-producers-in-the-midwestern-united-states>
7. Shambach, Amy. 2021. American paddlefish farmed fish fact sheet. Illinois-Indiana Sea Grant Fact Sheet: IISG21-SFA-BRC-054. <https://iiseagrant.org/publications/american-paddlefish-farmed-fish-fact-sheet/>
8. Shambach, Amy. 2021. Pacific white shrimp farmed fish fact sheet. Illinois-Indiana Sea Grant Fact Sheet: IISG21-SFA-BRC-051. <https://iiseagrant.org/publications/pacific-white-shrimp-farmed-fish-fact-sheet/>
9. Shambach, Amy. 2021. Rainbow trout farmed fish fact sheet. Illinois-Indiana Sea Grant Fact Sheet: IISG21-SFA-BRC-044. <https://iiseagrant.org/publications/rainbow-trout-farmed-fish-fact-sheet/>
10. Shambach, Amy. 2021. Tilapia farmed fish fact sheet. Illinois-Indiana Sea Grant Fact Sheet: IISG21-SFA-BRC-012. <https://iiseagrant.org/publications/tilapia-farmed-fish-fact-sheet/>
11. Shambach, Amy. 2021. Yellow perch farmed fish fact sheet. Illinois-Indiana Sea Grant Fact Sheet: IISG21-SFA-BRC-001. <https://iiseagrant.org/publications/yellow-perch-farmed-fish-fact-sheet/>
12. Carlton, J.S., Foley, C. Shambach, A., 2020. Walleye Aquaculture Working Group Workshop: Identifying Walleye Marketing and Production Barriers. <https://iiseagrant.org/publications/walleye-aquaculture-working-group-workshop-identifying-walleye-marketing-and-production-barriers/>

NICOLE WRIGHT
Aquaculture Extension Specialist and LEARN Coordinator
Ohio Sea Grant, The Ohio State University
352 W. Dodridge. St., Columbus, OH 43202 USA
Telephone: 330-202-3594 E-Mail: wright.1128@osu.edu

WORK HISTORY

- Aquaculture Extension Specialist and LEARN Coordinator, Ohio Sea Grant, Ohio State University Extension, The Ohio State University (2020-present).
- Project Coordinator, School of Environment and Natural Resources, Ohio Agricultural Research and Development Center, The Ohio State University (2019-2020).
- Program Coordinator, Department of Horticulture and Crop Science, Ohio Agricultural Research and Development Center, The Ohio State University (2017-2020).
- Seasonal Field Survey Technician, Plant Protection and Quarantine, Animal and Plant Health Inspection Service (2017-2019).
- Research Assistant, Department of Entomology, Ohio Agricultural Research and Development Center, The Ohio State University (2016).
- Program Coordinator, Ohio State University Extension, the Ohio State University (2007-2016).

EDUCATION

MS: Plant Health Management, The Ohio State University, Columbus, Ohio 2016.
BA: Sociology, Oberlin College, Oberlin, Ohio 1999.

REPORTS AND EXTENSION OUTREACH PUBLICATIONS

1. Inwood, S., Plakias, Z., Clark, J.K., Wright, N., Irish, A., & J.D. Vittie. (2022). *Preparing for Food System Resiliency in Ohio: Policy and Planning Lessons from COVID-19*. College of Food, Agricultural and Environmental Sciences & John Glenn College of Public Affairs, Technical Report. Columbus, OH: The Ohio State University
2. Pippidis, M., Braun, B., Ketterman, J., Inwood, S., Wright, N. (2022). *Engaging Communities Through Issues Forums: A How-To Guide*. Kansas City: Extension Foundation. ISBN: 978-1-955687-09-6
3. Wright, N., Plakias, Z., Inwood, S., Winslow, K., Samadi, K., and Barclay, D. (Lean on your Land Grant COVID-19 Food System Taskforce Leadership Team and Knowledge Exchange Staff). (2020). *Food System Expertise Mapping Report*. Internal Technical Report, College of Food, Agricultural, and Environmental Sciences.
4. Borawski E., Bottoms L., Pike S., Joshi K., Taggart M., Wright N., Osborne A., Freedman, D. (2016). *Fresh Local Produce for All: A Cleveland Success Story*. Cleveland, Ohio. *Prevention Research Center for Healthy Neighborhoods*. Case Western Reserve University.

SELECTED OUTREACH AND EDUCATION PRESENTATIONS

1. Wright, N. 2023. The Story of Yellow Perch. eeBLUE Aquaculture Literacy Mini-Grant Symposium. Virtual.
2. Wright, N. 2022. Growing Aquaculture Literacy Using Local Context.” National Aquaculture Extension Conference. Portland, ME.
3. Wright, N. 2022. Local Fish is Local Food: Commercial Fish Production in Ohio. Ohio Food Policy Network Virtual Convening. Virtual, OH.
4. Wright, N. 2021. Ohio: Aquaculture and Sea Grant. Lake Erie Science & Outdoor Writers Virtual Conference. Virtual, OH
5. Wright, N., Gardiner, M.M. 2016. Spider Mite Biological Control in Hops. Ohio Hops Field Night. Picketon, OH.
6. Wright, N., Wright, W. 2016. Beyond the Farmers’ Market: New Markets for Local Foods. Cleveland State University and Ohio State University Extension, Cuyahoga County. Wooster, OH.



September 14, 2023

Letter of Support and Collaboration

Dear Dr. Quagraine,

Please accept this letter in support of your NCRAC proposal titled "**Fish Preference Analytics Using Social Media and Sentiment Analysis.**" Ohio Sea Grant Extension is glad to be an Extension and outreach partner of this project to complete the scope of work outlined in Objectives 4 and 5 of the proposal.

Using online media analytics for insights into public sentiments of species important to North Central regional aquaculture is a novel approach to inform industry strategy. This approach has the power to reveal broader perceptions than surveys or interviews could. Results will be an important data set to inform an asset and science-based approach to future messaging and communications about and from the regional aquaculture industry.

Ohio Sea Grant is well positioned to translate and communicate research findings to producers and other industry stakeholders. I look forward to working with you and the project team. Please let me know if there is anything else you need.

Sincerely,

Nicole Wright
Ohio Sea Grant Extension Educator
The Ohio State University
wright.1128@osu.edu
330-202-3594

North Central Regional Aquaculture Center

Liaison Letter of Intent

In accordance with the Guidelines for Extension Involvement in the North Central Regional Aquaculture Center (adopted in 1994), directives of the NCRAC Board of Directors and USDA-NIFA guidance, all NCRAC-funded projects must include an Extension Liaison that is funded to do extension and outreach activities associated with that project. NCRAC projects must also include an Industry Liaison who will serve as a contact between project PI(s) and the industry.

Name (Appointed Liaison): Nicole Wright
Title of Project: Fish Preference Analytics Using Social Media and Sentiment Analysis

Project Duration: 2 years

The conditions and terms of the offer being made to you are outlined below:

Position (Extension or Industry): Extension


Primary Duties/Activities of Liaison:

Assist with industry networking activities including improving industry's understanding of Americans' perceptions of farmed fish from online chatter, as well as responding to trending issues, maximizing positive interactions with online consumers, and playing up the strengths of aquaculture to provide value for farmed fish.

Appointment offered by: Kwamena Quagraine 09/22/2023
Project Chair Date

Offer approved by: NCRAC Director Date

I have read and I understand the offer and its terms and conditions, and I agree to these terms and accept this offer. The terms of this offer may be modified only by subsequent written agreement signed by both parties.

Liaison signature:  9/23/2023
Date

North Central Regional Aquaculture Center

Liaison Letter of Intent

In accordance with the Guidelines for Extension Involvement in the North Central Regional Aquaculture Center (adopted in 1994), directives of the NCRAC Board of Directors and USDA-NIFA guidance, all NCRAC-funded projects must include an Extension Liaison that is funded to do extension and outreach activities associated with that project. NCRAC projects must also include an Industry Liaison who will serve as a contact between project PI(s) and the industry.

Name (Appointed Liaison): Amy Shambach
Title of Project: Fish Preference Analytics Using Social Media and Sentiment Analysis
Project Duration: 2 years

The conditions and terms of the offer being made to you are outlined below:

Position (Extension or Industry): Industry

Primary Duties/Activities of Liaison:

Liaise with the aquaculture industry, industry communicators, science writers, and other industry stakeholder's that utilize social media to improve industry's understanding of Americans' perceptions of farmed fish from online chatter. The liaison will also assist target audience in responding to trending issues, maximizing positive interactions with online consumers, and playing up the strengths of aquaculture to provide value for farmed fish.

Appointment offered by: Kwamena Quagraine 09/21/2023
Project Chair Date

Offer approved by: NCRAC Director Date

I have read and I understand the offer and its terms and conditions, and I agree to these terms and accept this offer. The terms of this offer may be modified only by subsequent written agreement signed by both parties.

Liaison signature:



Date 9/22/23



RDM Aquaculture LLC
101 N. 850 E.
Fowler IN 47944
765.299.9313

Dr. Stephen Dinsmore, Executive Director
North Central Regional Aquaculture Center (NCRAC)
Iowa State University
339 Science II Building, 2310 Pammel Drive
Ames, IA 50011

Dear Dr. Dinsmore,
I am very pleased to write a letter of support for the pre-proposal "Fish Preference Analytics Using Social Media and Sentiment Analysis" being submitted by Dr. Kwamena Quagrainie and others for funding consideration from NCRAC.

I am a shrimp farmer and have an active online presence. I strongly believe that social media is important for my business to get the word out about what we offer and what we do, and at the same time see what my customers and others are posting online about shrimp. The only complaint I have about online posts is, there are so many posts and I have to keep up on all of them so this project will be a big relief in sorting out all the positives and negatives about aquaculture fish posts online. I will particularly be interested in analysis of online data relating to farmed shrimp.

This is a very important study that will also allow our industry to relate and communicate with a lot of our prospective clients. I strongly encourage NCRAC to fund this project as it will provide a unique analysis of consumer sentiments and thereby allow fish producers to join hands and move this industry forward.

Sincerely,

Karlanea Brown

Co-Owner /VP of Production
101 N. 850 E.
Fowler IN 47944

Indiana Livestock Certified, & HACCP Seafood Certified.

Ashtyn Reed Chen
CEO
OceanArc Technologies
3600 Hazelton-Etna Rd. SW.
Pataskala, OH 43062

May 30, 2023

Director
North Central Regional Aquaculture Center (NCRAC)
Iowa State University

RE: Fish Preference Analytics Using Social Media and Sentiment Analysis Proposal

This letter is in support of the above proposal from Dr. Quagraine and his team. In this digital dispensation, learning more about social media and how it can benefit our industry will be the right step to help grow the domestic aquaculture industry. Companies are compiling information from social media users and using it to develop their marketing strategies and the aquaculture industry has to learn from that.

OceanArc Technologies is an aquaculture company based in Ohio with a fish farm and restaurants that serve local fish. We use social media and are currently working with a marketing guru to build a TikTok and Instagram presence for OceanArc Technologies. The idea is to bring people to see our farm, restaurants and other farm-related industries to agriculture/aquaculture. It's a lot of work but it is worthwhile if we want to grow our business and meet the needs of consumers. I see too many influencers who aren't actual farmers doing this and going viral. They may have good intentions but many of them don't have the knowledge to verify facts from fiction so we need that kind of online information from this proposed project to help us as an industry gauge online sentiments and respond appropriately to meet the preferences of consumers.

I strongly support this proposal and urge NCRAC to give it serious consideration for funding.

If I can be of any further assistance, or provide you with any further information, please do not hesitate to contact me.

Warm Regards,





June 3, 2023

Professor Stephen Dinsmore, Interim Director,
North Central Regional Aquaculture Center,
Iowa State University,
339 Science II Building, 2310 Pammel Drive,
Ames, IA 50011

Dear Professor Dinsmore,

I am writing this letter of support for Kwamena Quagrainie and Amy Shambach at Purdue University concerning their proposal "Fish Preference Analytics Using Social Media and Sentiment Analysis." We all know that a business cannot stay behind the developments on social media. It has become an important avenue to get information out about our business and also get feedback about our business as people post their feelings and sentiments online.

Jones Fish is an industry leader in aquatic resource management, pond aeration and Midwestern gamefish stocking. Over the years, we have grown from a small, two-man operation in southwestern Ohio to an industry leader with ten locations, a footprint that encompasses all of Ohio, Indiana, Kentucky, Wisconsin, Alabama and Tennessee and a proficient staff of over 100 biologists.

Jones Fish has stocked thousands of ponds and lakes throughout the country. We raise and sell over 19 different fish species including Largemouth Bass, Bluegill Sunfish, Hybrid Bluegill, Channel Catfish, Fathead Minnows, Rosy Red Minnows, Golden Shiners, Hybrid Striped Bass, Rainbow Trout, Yellow Perch, Smallmouth Bass, Walleye, Tilapia, Domestic Koi, and Goldfish. Our headquarters and hatchery are located in Cincinnati, Ohio.

I support the proposal to look at social media sentiments because there is a lot about what people post online that we can learn to help our business. For us, we take great pride in the positive feedback we get from customers. We are also proud of the services that we offer and our family name so we monitor online comments about our business. That is why I think this proposal is very important to help the aquaculture industry to know what people are saying online and use it to help the industry.

I am in support of this proposal and I hope it is funded by NCRAC.

Sincerely

Adam Hater
Chief Operating Officer

CORPORATE HEADQUARTERS | 3433 CHURCH ST. | CINCINNATI, OH 45244

SALES@JONESFISH.COM | 800.662.3474 | JONESFISH.COM | FAX: 513.561.6251

Urban Transformation Network At Metro Farms

4250 W. Chicago ave.

chicago il. 60651

June 7, 2023

Professor Dinsmore, Director,
North Central Regional Aquaculture Center (NCRAC),
Iowa State University,
Ames, IA.

Dear Dr. Dinsmore,

We at Urban Transformation Network – Metropolitan Farms in Chicago actively engage the community in educational workshops that raise awareness about urban gardening, aquaponics, and other local workforce development programs. We have a vibrant aquaponics program and a continuing research and extension programming relationship with Purdue University and Illinois-Indiana Sea Grant.

Professor Quagraine has approached me about a project he wants to work on titled “Fish Preference Analytics Using Social Media and Sentiment Analysis.” Metro-Farms has a very active online presence. It is one of the avenues we advertise our business - aquaponics (fish and greens) and recruit for the different programs we offer, including workforce development.

I support Professor Quagraine’s study because the aquaponics business and educational programming need social media to survive the business world we live in now. Everybody goes online to look for stuff and write all sorts of comments so we need such an analysis to understand what people are saying so that we can respond appropriately.

NCRAC should seriously consider the study since we depend on consumers to sell our products and we need to know what they think and write online.

Thank you for your time.

if you have any questions please don't hesitate to call or email me Treana Johnson
Treana250@gmail.com 773-495-8019

Checklist for Submission of Full Proposals

Follow guidelines with the exception of the budget sheets.

- Format manuscripts for 22 x 28 cm (8½ x 11 inch).
- Number *all* pages sequentially.
- Use 10-12 font; Times New Roman. Do not justify right margins.
- Format headings appropriately.
- Leave at least a 2.5-cm (1-inch) margin on all sides.
- Use metric units of measurement with English units in parenthesis, e.g. 2.54 cm (1 inch).
- Define all abbreviations the first time they are used.
- Express ratios by using a slant line (e.g. mg/L).
- Scientific names should accompany common names in the title and when they are first mentioned in the abstract and in the text. Authority for scientific names need not accompany the genus and species unless needed for clarity.
- Spell out one to ten unless followed by a unit of measurement (e.g. four fish, 4 kg, 14 fish). Do not begin a sentence with a numeral. Use 1,000 instead of 1000; 0.13 instead of .13; and % instead of percent.
- Use the 24-hour clock for dial time: 0830, not 8:30 a.m. The calendar date should be day month year (7 August 1990).
- Include signed Letters of Intent for identified Extension and Industry Liaisons.
- Signed Authorized Organization Representative (AOR) form from each funded PI's institution are welcomed but not required at this time.
- Include the required three (3) Letters of Support from Industry members who are not directly involved in the proposed project.
- Assemble the full proposal in this order: Title Page, Project Summary, Justification, Related Current and Previous Work, Statement Regarding Duplication of Research, Anticipated Benefits, Objective(s), Deliverables, Procedures, Project Deliverables, Evaluation and Outreach (Logic Model included), Facilities, References, Project Leaders, Budget, Budget Explanation per Institution, Budget Summary, Schedule for Completion of Objectives. References, Participating Institutions and Principal Investigators, Curriculum Vitae for Principal Investigators (PIs).
- Provide names of three possible reviewers who will not have a Conflict of Interest
- All identified co-PIs have been provided a final draft of the full proposal.
- Submit proposal (including all required documentation) in single MS Word document.

If the NCRAC Administrative Office cannot verify inclusion of any element, the Full Proposal will not be accepted.



9/22/2023

Principal Investigator Signature

Date

Reviewers

Dr. Simone Valle de Souza
Michigan State University, MI
Phone: 517-353-0341
Email: valledes@msu.edu

Dr. Courtney Bir
Oklahoma State University, OK
Phone: 405-744-9813
Email: courtney.bir@okstate.edu

Dtr. Max Melstrom
Loyola University, IL
Phone: 773-508-2948
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