



73rd Pacific Fisheries Technologists Conference

The Hyatt Regency Lake Washington
Renton, WA, USA
February 26 – March 1, 2023

Ready About!





PFT 2023 PROGRAM BOOK

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PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

Ready About!



Welcome to the 73rd PFT Conference!

What an honor and privilege it is for me to serve as this year's Pacific Fisheries Technologists (PFT) president. PFT has always been my favorite conference to attend each year. I have been to other conferences that are so large that I am drowning in a sea of unrecognizable faces, where I felt insignificant and overwhelmed. But not at PFT. From the moment I stepped foot into my first PFT conference room, it felt like I belonged. This welcoming group is composed of representatives from academia, regulatory agencies, and industry. The conference rotates locations up and down the Pacific Coast to allow regional specialties to be highlighted, and whenever it is in Washington state, Seafood Products Association has historically helped host.

In our current world we are surrounded by quite a bit of polarizing opinions on how something is either black or white. But why not gray? Why not tangerine, or fuchsia?! Ah, I am an optimist! As a big proponent for active listening, insightful questioning and giving both sides of the coin a good looking over, sometimes even I end up agreeing with points from both sides – and there's nothing wrong with that. So, I would like to welcome you to

practice this art of thinking at our 73rd PFT conference at the Hyatt Regency Lake Washington in Renton, WA from February 26, 2023 through March 1, 2023. It will be a wonderful opportunity to learn and discuss some dramatic topics that the organizing committee is working hard to put together such as offshore wind energy, cell- and plant-based seafoods, and marine plastics – topics that will foster this year's theme, "Ready About!"

To progress a sailboat in the desired direction upwind, this "Ready About!" sailing phrase is used by the skipper before the bow (aka: the pointy end) of the boat is turned toward and through the wind. When everything is in place, the crew responds, "Ready", and will keep their heads down to avoid being knocked over by the boom as the skipper turns the boat. It is a timely analogy to the future of seafood that is coming in hot, and I want us all to be ready about. The seas ahead may be rough, but I look forward to sailing them with you!

Virginia Ng
73rd PFT President



PFT 2023 ORGANIZING COMMITTEE

<p>Virginia Ng President</p> 	<p>Senya Joerss Scientific Program Director</p> 	<p>Rosalee Hellberg Student Competition Chair</p> 	<p>Lin Koh Treasurer</p> 
<p>Alex Oliveira Secretary</p> 	<p>Christina DeWitt Past President, 2022</p> 	<p>Laurice Churchill Advisor for Regulatory Affairs</p> 	<p>Lenna Southland Registration</p> 
<p>Jae Park Special Advisor Past President, Oregon</p> 	<p>Joe Logan Sponsorship</p> 	<p>John Lin Advisor for Industry</p> 	<p>Jose Luis Cardenas Lopez 2019 Past President</p> 
<p>Cory Bell Hospitality Chair</p> 	<p>Craig Holt Webmaster</p> 	<p>Area Representatives: Alaska – Marlin Keith Cox British Columbia – John Boyce Washington – Bruce Odegaard Oregon – Jung Kwon California – Briana Hurley Mexico - Carmen Maria Lopez Saiz Representative at Large – Evelyn Watts</p>	



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KEYNOTE SPEAKER



Bruce Odegaard

Vice President of Product Services
Seafood Products Association

The son of a fisherman's son, Bruce has not drifted far from the Seafood Industry. Just bad luck, or as Grandpa Kris contended, a curse of the stink. Bruce moved from the fishing grounds to Quality Assurance for Icicle Seafoods, Petersburg in 1980, which kept him land bound in the summers while exploring various career paths in science, psychology and communications at Washington State University and then Western Washington University. Bruce has been with the Seafood Products Association since 1992 when it was the National Food Processors Association, where he first managed the sensory examination lab before taking over for George Berkompas in 2004, as Head of Inspection. Currently, Bruce holds the title of Vice President of Product Services. Besides smelling fish or providing direct member assistance with technical and regulatory

issues, Bruce also continues developing training curriculum that addresses the needs of member employees' as SPA continues to bolster its educational outreach.



INVITED SPEAKERS



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Dr. Christine Alvarado

Senior Food Scientist
PROSUR

Dr. Christine Alvarado earned her B.S. in Biomedical Science, and MS and Ph.D. in Food Science from Texas A&M University. Her previous experience has included academic research and education for the poultry industry, a subject matter expert for USDA FSIS policy development, and commercial and allied industries. Currently, she works for Prosur as a senior food scientist where her expertise in industry, government and academia provides insight for consumers to improve their quality, food safety and process efficiency.



Chris Bryson

Founder and CEO
New School Foods

Chris is the Founder & CEO at New School Foods, a startup that makes whole-cut seafood from plant-based ingredients. New School Foods has developed a proprietary food structuring technology and their first product is a fillet that looks, cooks, tastes and flakes just like salmon. The company has been selected as a semifinalist in the XPRIZE's Feed the Next Billion competition. Chris founded New School Foods after his last company was acquired by Instacart in 2018, and is a startup mentor focused exclusively on alt-protein.



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Dr. Lyda Harris

Environmental Sustainability and Conservation Scientist
Boeing

Dr. Lyda Harris is currently an environmental sustainability and conservation scientist at Boeing in Everett, WA. She has previously worked in consulting, NGO, and academic settings and has over 10 years of experience in marine pollution, data science, zero waste, and public policy. She earned her PhD from the University of Washington in the Department of Biology studying marine microplastic pollution and how it affects organisms, ecosystems, and policy.



Brian Jacobson

Associate Director of Strategic Operations
University of Illinois

Brian Jacobson is the Assistant Director of Pilot Plant Operations at the University of Illinois, managing operations of the newly constructed Integrated Bioprocessing Research Laboratory and Food Science & Human Nutrition Pilot Processing Plant. Brian grew up working on the family farm, raising traditional midwestern crops and production animals while enjoying an appreciation of nature and the outdoors. Brian has collaborated with academic researchers and industry clients during the initial ideation and product development phases through product launch and ongoing process improvement, optimization, and production support. Technologies and product experience include industrial fermentation, plant commodity fractionation and extractions, liquid separations, functional beverages, baked goods, retorted products, extrusion, meat processing, and others.



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Dr. David Kingsley

Molecular Biologist
United States Department of Agriculture



Justin Kolbeck

Co-Founder and CEO
Wildtype

Justin Kolbeck is co-founder and CEO of Wildtype, which is on a mission to create the cleanest, most sustainable seafood on the planet. Before Wildtype, he spent nearly five years as a consultant at Strategy& helping companies develop and launch products, grow into new markets, and operate efficiently. Justin started his career as a Foreign Service Officer, serving in Pakistan, Afghanistan, Australia, and Washington DC. He is a graduate of the Yale School of Management, L'Institut d'Études Politiques de Paris, and UC Berkeley.



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Heather Mann

Executive Director
Midwater Trawlers Cooperative

Heather Munro Mann has served as the executive director of MTC since 2013. Heather sits on a number of boards and committees, including the North Pacific Fishery Management Council Advisory Panel and the Seafood Harvesters of America Board of Directors. She chairs the Port of Newport's Commercial Fishing Users Group (CFUG) committee and has extensive experience in the commercial fishing and seafood processing industry. Prior to joining MTC, she was the deputy director of the West Coast Seafood Processors Association and the director of the Seafood Consumer Center/Community Seafood Initiative. A native of Massachusetts, Heather currently resides in Newport, OR.



Dr. Reza Ovissipour

Assistant Professor
Virginia Tech

Reza Ovissipour is an Assistant Professor at Virginia Tech. He holds a Ph.D. in Bioprocessing and a Ph.D. in Biological Systems Engineering. Reza's program is FutureFoods Lab and Cellular Agriculture Initiative, focusing on alternative proteins, cultivated meat, cell line development, media optimization, and scaffold development. Reza has been working with startup companies and has extensive experience working on food safety, HACCP, and food quality.



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Lisa Pffiefer

Economist
National Oceanic and Atmospheric Administration (NOAA)

Lisa received a B.S. in agricultural economics from the University of Nebraska-Lincoln in 2003. She attended graduate school at the University of California-Davis, and received a Ph.D. from the Department of Agriculture and Resource Economics in 2009. She worked at the Alaska Fisheries Science Center for 3 years as a post-doc for the Bering Sea Integrated Ecosystem Research Project, and joined the Northwest Fisheries Science Center in December of 2012.



Michaella Rogers

Project Manager
XPRIZE Feed the Next Billion

Michaella Rogers is the Project Manager of XPRIZE Feed the Next Billion, a global prize competition that incentivizes teams to create chicken breast and fish filet alternatives. Michaella provides day-to-day oversight of prize operations and manages global milestone events for the competition. Prior to joining XPRIZE, Michaella worked as a Project and Communications Manager at a prominent Seattle law firm. Her experience also includes work in international development and public policy.

Michaella holds a Master of Public Administration and a Technology Entrepreneurship Certificate from the University of Washington and a Project Management Professional (PMP) Certification. She earned her Bachelor of Arts in International Relations with a Minor in Italian from the University of Colorado. She lives and works in sunny Denver, Colorado and enjoys getting up to the mountains as much as possible.



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Dr. Kevin Stokesbury

Professor
UMass Dartmouth

Kevin Stokesbury is a professor in the Department of Fisheries Oceanography, School for Marine Science and Technology (SMAST), at the University of Massachusetts Dartmouth. His research examines the marine ecology of invertebrates and fish, their spatial distribution, population dynamics, and the impacts of fishing and energy development. For the past 20 years, his work has focused on the sea scallop resource, including stock assessment, rotational fishery management strategies, growth and mortality estimates, gear development, and environmental assessment. Most of his research is collaborative with the fishing industries of Canada and the United States and he was awarded the David H. Wallace Award from the National Shellfish Association (2013) and the Standard-Times Southcoast Man of the Year (2018) for his two decades of

science in the public interest, and the connections he has made between fishermen and science.



Steven Wilson

Chief
Seafood Inspection Program, National Marine Fisheries
Services Office of International Affairs, Trade, and
Commerce

Mr. Wilson is a lead figure for seafood inspection in NOAA. He holds a BS degree in Food Science and Industry and a Master of Business Administration, and has worked in the seafood industry and as an inspector or manager in the Seafood Inspection Program for over thirty-five years including the positions of HACCP Program Manager, Deputy Director of Field Operations, Chief Quality Officer, Assistant Director for Quality and Technology and Deputy Director. He is now the Chief of the

Seafood Inspection Program for the NMFS Office of International Affairs, Trade, and Commerce.

Mr. Wilson has served on the Conference for Food Protection and the HACCP Library Steering Committee for the National Center for Food Safety and Technology. He has also served as the representative of the United States in several international workshops and seminars as an expert in HACCP and Quality Systems for the seafood industry. He participates as one of the US experts in the development and maintenance of the ISO 22000 family of standards.



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Dr. Yanyun Zhao

Associate Dean, College of Agriculture Sciences
Professor, Dept. of Food Science and Technology
Oregon State University

Dr. Yanyun Zhao is the Associate Dean for Faculty Affairs at the College of Agricultural Sciences and a Professor in the Department of Food Science & Technology at Oregon State University (OSU). As an professor, she leads the Sustainable Food Packaging and Processing research program at OSU (<https://agsci-labs.oregonstate.edu/sfpp>). Dr. Zhao is an internationally recognized prominent researcher in developing new knowledge and applications for edible food packaging and utilization of agriculture and food processing byproducts to develop eco-friendly packaging. Dr. Zhao is an elected 2012 IFT

(Institute of Food Technologists) Fellow, the recipient of numerous awards, has generated 10 granted patents and licensed technologies in sustainable packaging, over 180 peer-reviewed journal publications, over 20 book chapters, and edited 2 books.



PROGRAM OUTLINE



PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

Ready About!

SUNDAY FEBRUARY 26, 2023

- 4:00 – 6:00 pm **Registration** – Bellevue Foyer
- 6:00 – 8:00 pm **PFT President's Reception** – Seattle (*Sponsored by Trident Seafoods*)
* *Door prize*
- 8:00 – 9:00 pm **PFT Executive Meeting** – Adams
- 9:00 pm – Midnight **Cards and Social Hour** – Hospitality Suite (*Sponsored by Seafood Products Association*)
-



PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

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MONDAY FEBRUARY 27, 2023

- 8:00 – 11:00 am **Registration** – Bellevue Foyer
- 8:00 – 9:00 am **Breakfast** – Bellevue Foyer (*Sponsored by AFCO | A Zep Company*)
- 9:00 – 9:15 am **Opening Remarks** – Virginia Ng, 73rd PFT President, **Door prize*
- 9:15 – 9:45 am **Keynote Address: The History of PFT: A Look Back at How PFT Started and Where We Are At** – Bruce Odegaard (Seafood Products Association)
-

SESSION 1 – What History Can Tell Us – Bellevue I

Moderator – Virginia Ng (Seafood Products Association)

- 9:45 – 10:00 am **OSU Surimi School: Past and Future** – Dr. Jae Park (OSU Seafood Laboratory)
- 10:00 – 10:20 am* **Museum Specimens Reveal 90 Years of Change in *Contracaecum* spp. in Puget Sound, Washington** – Natalie Mastick (University of Washington), *Virtual*
** Student competition*
- 10:20 – 10:40 am **Morning Break, *Door prize**
-

SESSION 2 – Alternative Seafoods – Bellevue I

Moderator – Dr. Marlin Keith Cox (Seafood Analytics)

- 10:40 – 11:00 am **Cell-based Seafood Research** – Dr. Reza Ovissipour (Virginia Tech), *Invited Speaker - Virtual*
- 11:00 – 11:20 am **Competition Driving Innovation** – Michaella Rogers (XPRIZE Foundation), *Invited Speaker*
- 11:20 – 11:45 pm **Alternative Seafoods Panel Discussion** – Justin Kolbeck (Wildtype), *Invited Speaker*; Chris Bryson (New School), *Invited Speaker – Virtual*; Brian Jacobson (University of Illinois), *Invited Speaker – Virtual*; Michaella Rogers (XPRIZE Foundation), *Invited Speaker*; and Dr. Reza Ovissipour (Virginia Tech), *Invited Speaker – Virtual*



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11:50 – 12:00 pm **Sponsor Presentation: Updates at the Alaska Seafood Marketing Institute** – John Burrows

12:00 – 1:00 pm **Lunch** – Bellevue Foyer (*Sponsored by PROSUR*), *Door prize

SESSION 3 – Novel Technologies – Bellevue I

Moderator – Dr. Christina DeWitt (Oregon State University – Seafood Laboratory)

1:00 – 1:20 pm* **Determining the Effectiveness of Communion Methods for Cell Lysis of Fish Byproducts** – Bryan Gaspich (Oregon State University), Virtual
* *Student competition*

1:20 – 1:40 pm **Antioxidant, Antimutagenic, and Antiproliferative Properties of Pigment Extracts From Octopus Vulgaris Skin** – Dr. Josafat Marina Ezquerra-Bauer (Universidad de Sonora), Virtual

1:40 – 2:00 pm **In-Vitro Digestion of Ingredients for Nile Tilapia Feeds Using Their Endogenous Digestive Alkaline Proteases** – Dr. Jose Luis Cardenas-Lopez (Universidad de Sonora)

2:00 – 2:15 pm **Afternoon Break**, *Door prize

SESSION 4 – Seafood Safety – Bellevue I

Moderator – Dr. Michael Ciaramella (New York Sea Grant)

2:15 – 2:55 pm **Putting the Cold Squeeze on Shellfish-borne Viruses** – Dr. David Kingsley (United States Department of Agriculture), *Invited Speaker*

2:55 – 3.40 pm **Non-thermal Control of *Listeria monocytogenes* in Roe Products** – Dr. Christine Alvarado (PROSUR), *Invited Speaker*



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SESSION 5 – Poster Session – Bellevue II

Moderator – Dr. Rosalee Hellberg (Chapman University)

3:40 – 5:00 pm

The Greening Reaction of Skipjack Tuna (*Katsuwonus pelamis*) Metmyoglobin Promoted by Free Cysteine During Thermal Treatment – Dr. Andrés Álvarez-Armenta (Centro de Investigación en Alimentación y Desarrollo, A.C.)

N-(2-ozoazepan-3-yl)-pyrrolidine 2-carboxamide, a Bioactive Compound Found in *Octopus vulgaris* Ink, Exhibits Antiproliferative and Pro-Apoptotic Effect on Human Cancer Cell Lines – Dr. Armando Burgos-Hernández (Universidad de Sonora)

Lipidic Compounds from the Muscle of White Shrimp (*Litopenaeus vannamei*): Chemical Structure and Effect on the Proliferation and Morphology of Human Cancer Cell Lines – Sandra Carolina De La Reé Rodríguez (Universidad de Sonora)
* *Student competition*

Optimization of DNA-based Methods For the Detection of Canned Tuna Species – Aubrey Emmi (Chapman University)
* *Student competition*

Evaluation of *Octopus vulgaris* and *Dosidicus gigas* Skin Pigment Extracts As An Antioxidant and Preservative in Chicken Burger – Dania Marisol Esparza Espinoza (Universidad de Sonora)
* *Student competition*

Protein Identification of Skate (*Raja Kenojei*) Muscles Fermented Under Anaerobic Conditions with Vacuum by LC-MS – Dr. Jong-Bang Eun (Chonnam National University)

Influence of a Phytochemical Compound on Digestive Carboxylesterases from Penaeid Shrimps (*Litopenaeus vannamei* and *Litopenaeus stylirostris*) – Dayne Darlen Lezama-Balderrama (Instituto Tecnológico de Sonora)
* *Student competition*

Effect of Astaxanthin and Eicosapentaenoic Acid Extracted From White Shrimp (*Litopenaeus vannamei*) on Prostate Cancer Cell Cycle Arrest – Dr. Carmen Maria López Saiz (Universidad de Sonora)

Thermal Inactivation of *Listeria monocytogenes* in Ready-to-Eat Crabsticks – Dr. Jae W. Park (Oregon State University)



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Low Molecular Weight Components Present in Jumbo Squid (*Dosidicus gigas*) Muscle and Its Myofibrillar Protein Protection Against Denaturation and/or Aggregation During Frozen Storage

– Dr. Juan Carlos Ramírez-Suárez (Centro de Investigación en Alimentación y Desarrollo)

Labeling Compliance, Species Authentication, and Short Weighting of Frozen Shrimp Sold in Grocery Stores in Southern California – McKenna Rivers (Chapman University)

** Student competition*

Detection and Partial Characterization of Chemopreventive Compounds from White Shrimp (*Litopenaeus vannamei*) Cephalothorax – Héctor-Enrique Trujillo-Ruiz (Universidad de Sonora)

** Student competition*

4:30 pm

*** Door prize**

DINNER ON YOUR OWN

8:00 pm – Midnight **Cards and Social Hour** – The Hospitality Room (*Sponsored by OSU Surimi School*)



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TUESDAY FEBRUARY 28, 2023

- 8:00 – 11:00 am **Registration** – Bellevue Foyer
- 8:00 – 9:00 am **Breakfast** – Bellevue Foyer (*Sponsored by Wesmar Company, Inc.*)
- 9:00 am *** Door prize**
-

SESSION 6 – Wind Energy – Bellevue I

Moderator – Laurice Churchill (Office of International Affairs, Trade, and Commerce (IATC), Seafood Inspection Program, NOAA Fisheries)

- 9:00 – 9:20 am **Interactions of Offshore Wind Development and Fishery Industries** – Dr. Kevin Stokesbury (University of Massachusetts Dartmouth), *Invited Speaker - Virtual*
- 9:20 – 9:40 am **NOAA Fisheries’ Role in Offshore Wind Energy Development on the West Coast** – Dr. Lisa Pfeiffer (NOAA Fisheries), *Invited Speaker*
- 9:40 – 10:00 am **The View From the Water: Fishing Industries Respond to Offshore Wind Energy Development** – Heather Mann (Midwater Trawlers Cooperative), *Invited Speaker*
- 10:00 – 10:15 am **Wind Energy Panel Discussion** – Dr. Kevin Stokesbury (University of Massachusetts Dartmouth), *Invited Speaker - Virtual*; Dr. Lisa Pfeiffer (NOAA Fisheries), *Invited Speaker*; Heather Mann (Midwater Trawlers Cooperative), *Invited Speaker*
- 10:15 – 10:30 am **Morning Break, *Door prize**
-

SESSION 7 – Novel Technologies – Bellevue I

Moderator – Senya Joerss (Trident Seafoods)

- 10:30 – 10:50 am* ***In silico* Prospecting For Novel Bioactive Peptides in *Crassostrea gigas*** – Leyi (Hailey) Zhou (Oregon State University), *Virtual*
** Student competition*
-



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SESSION 8 – Workforce – Bellevue I

Moderator – Kevin Graham (Wesmar Company, Inc.)

- 10:50 – 11:15 am **Fostering a Food Safety Culture in Your Sanitation Team** – John Boyce (Boyce Food Safety Consulting Ltd.)
- 11:15 – 11:35 am **Superheated Steam Effectively Inactivates Diverse Microbial Targets Despite Mediating Effects From Food Matrices in Bench-scale Assessments** – Dr. Yadwinder Singh Rana (Chicken of the Sea International)
- 11:35 – 12:00 pm **How Safe Is Our Packaging? Understanding Potential Food Safety Hazards in Packaging** – Clare Winkel (Integrity Compliance Solutions)
- 12:00 – 1:00 pm **Lunch** – Bellevue Foyer (*Sponsored by Alaska Seafood Marketing Institute*), *Door prize
-

SESSION 9 - Sustainability – Bellevue I

Moderator – John Boyce (Boyce Food Safety Consulting Ltd.)

- 1:00 – 1:40 pm **Sustainable Packaging to Protect Environment and Provide Consumer Convenience** – Dr. Yanyun Zhao (Oregon State University), *Invited Speaker*
- 1:40 – 2:10 pm **Improperly Discarded Plastic Food Packaging** – Jack Cooper (Animal Digestible Food Packaging Initiative)
- 2:10 – 2:45 pm **Microplastics in Our Marine Environment** – Dr. Lyda Harris (Boeing), *Invited Speaker*
- 2:45 – 3:00 pm **Afternoon Break**, *Door prize
-



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SESSION 10 – Seaweed Safety – Bellevue I

Moderator – Dr. Jon Bell (National Seafood Inspection Lab, OSF, NOAA Fisheries, U.S. Department of Commerce)

- 3:00 – 3:20 pm **Biofunctionalities of Seaweed Hydrolysates and Synthetic Peptides From Pacific Dulse (*Devaleraea mollis*): An *in vitro* and *in silico* Prospecting Approach** – Dr. Rufa Mendez (Zamboanga State College of Marine Sciences and Tech), Virtual
- 3:20 – 3:40 pm **Bringing Seaweed Safely to Market as Food** – Dr. Michael Ciaramella (New York Sea Grant)
-

SESSION 11 – Novel Technologies – Bellevue I

Moderator – Senya Joerss (Trident Seafoods)

- 3:40 – 4:00 pm **Multi-mode Spectroscopy Analysis of Fish Species and Quality** – Nicholas MacKinnon (SafetySpect Inc)
- 4:00 – 4:10 pm **Sponsor Presentation: PROSUR** – Simon Claessens
-

- 4:15 – 5:15 pm **PFT General Meeting** – Bellevue I
- 5:15 pm *** Door prize**
- 6:00 – 7:00 pm **Cocktails** – Bellevue Foyer
- 7:00 pm *** Door prize**
- 7:00 – 9:00 pm **PFT Banquet & Student Awards** – Bellevue I (*Dinner Sponsored by Pacific Seafood and Student Awards Sponsored by Seafood Industry Research Fund*)
- 9:00 – Midnight **Cards and Social Hour** – The Hospitality Suite (*Sponsored by Chicken of the Sea | Thai Union*)
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PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

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WEDNESDAY MARCH 1, 2023

- 8:00 – 9:30 am **Registration** – Bellevue Foyer
- 8:00 – 9:00 am **Breakfast** – Bellevue Foyer (*Sponsored by BIOMedix*)
- 9:00 am *** Door prize**
-

SESSION 12 – Industry Best Practices – Bellevue I

Moderator – Lin Koh (The Fishin' Company)

- 9:00 – 9:20 am **Impact of Temperatures and Florfenicol Treatment on the Microbial Populations Present in Catfish and Its Rearing Systems** – Dr. Luxin Wang (University of California – Davis), Virtual
- 9:20 – 9:45 am **Elevated Histamine Levels Found in Salted Canned Anchovies: Review of Recall Filed with USFDA (November 2022)** – Dr. Alexandra Oliveira (Chicken of the Sea International)
- 9:45 – 10:15 am **When Regulations Meet Food Trends** – Rebecca Durkota (Trident Seafoods) and Anneloes Silvertand (Trident Seafoods)
- 10:15 – 10:30 am **Morning Break, *Door prize**
-

SESSION 13 – Regulatory Updates – Bellevue I

Moderator – Virginia Ng (Seafood Products Association)

- 10:30 – 11:10 am **FDA's Traceability Rule; It's Time to Get Started** – Lisa Weddig (National Fisheries Institute)
- 11:10 – 11:40 am **Updates from the Seafood Inspection Program** – Steven Wilson (National Marine Fisheries Services Office of International Affairs, Trade, and Commerce), *Invited Speaker – Virtual*
- 11:40 am *** Door prize**
- 11:40 am – Noon **Closing Remarks and Passing of the Gavel**
-



ORAL ABSTRACTS



Title: Non-thermal Control of *Listeria monocytogenes* in Roe Products

Authors: Carmen Ortuno Cases¹, Isidro Guillen Lopez¹, Juan de Diaz Hernandez-Canovas¹, Presenter: **Christine Alvarado**^{2*}

¹Prosur, Murcia, Spain

²Prosur Inc. Naperville, Illinois

Abstract:

Introduction

Roe products pose a significant likelihood and severity of *Listeria monocytogenes* (LM) due to limited processing and ready-to-eat (RTE) classification. This challenge study investigates the efficacy of a natural antimicrobial developed from fruit and spice extracts (T2NWLFV) on the inhibition of LM in Tarako and Ikura.

Materials and Methods

Frozen salmon and salted pollock roe were obtained from a processor, microbiologically analyzed for initial load, inoculated with LM, and treated with T2NWLF during processing and as a seasoning (0.4% or 0.8% T2NWLF) during a commercially simulated Tarako or Ikura process. As an additional study, the salted pollock roe was washed four times with a 10% T2NWLF solution to determine the efficacy on raw material microbial load reduction. Analyses (aerobic mesophilic counts, *Listeria*, *E. coli*, coliform, molds and yeasts) were conducted daily for 7 days (7°C). The study was repeated three times prior to analysis of data.

Results and Discussion

The 10% T2NWLF resulted in a 2-log reduction (below detection) of LM after three washes in Tarako. In both Tarako and Ikura, T2NWLF used as a processing spray and seasoning resulted in a decrease in LM to non-detectable counts by the end of the shelf-life analysis.

Conclusion

This challenge study determined that T2NWLF is effective against LM in both Tarako and Ikura products when used in a multi-hurdle processing approach.

***Presenter**



PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

Ready About!

Title: Fostering a Food Safety Culture in your Sanitation Team

Presenter: **John Boyce**, Consultant, Boyce Food Safety Consulting Ltd.

Abstract:

A food company's sanitation team is vital in maintaining food safety a quality. This presentation will delve into the concept of Food Safety Culture, which is necessary to promote shared values, beliefs, and norms regarding food safety in the crew responsible for cleaning.



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Ready About!

Title: Alternative Seafoods Panel Discussion

Presenters: Chris Bryson^a, Brian Jacobson^b, Justin Kolbeck^c, Michaella Rogers^d, Reza Ovissipour^e

^a New School Foods, Toronto, Ontario, Canada

^b University of Illinois, Champaign, IL

^c Wildtype, San Francisco, CA

^d XPRIZE, Culver City, CA

^e Virginia Tech, Blacksburg, VA

Abstract:

According to the Food and Agriculture Organization (FAO), global fish consumption has been steadily increasing from the 1960s to current times at astonishing rates. In fact, fish consumption per capita per year grew from 9.0 kg in 1961 to 20.3 kg in 2017. This phenomenon, according to the FAO, is caused by a myriad of factors which include advances in processing technology, cold chain development, enhanced logistics, and increased awareness from consumers of the health benefits of eating fish.

It is estimated that by the year 2050 there will be 9.6 billion people who will need sustainably sourced and nutritious foods, which is why innovation towards alternative proteins has been accelerated. Since this innovative space is still small and seafood comes in such various forms, every single alternative seafood company is doing something unique and exciting. From plant-based to cultured to fermentation techniques, alternative seafood can serve as a supplement to conventional seafood. There really is room for everyone.



Title: *In vitro* digestion of ingredients for Nile Tilapia (*Oreochromis niloticus*) feeds using their endogenous digestive alkaline proteases

Authors: Bañales-Vázquez, Roberto^a, Ezquerro-Brauer, Josafat Marina^a, Bringas-Alvarado, Lorena^a, Montoya-Camacho, Nathaly^b and **Cárdenas-López, José Luis^{a*}**

^a Departamento de Investigación y Posgrado en Alimentos, Universidad de Sonora, Hermosillo, Sonora, México

^b Universidad Estatal de Sonora, Hermosillo, Sonora, México

Abstract:

Tilapia is the world's second most cultivated fish species and first place of freshwater fish aquacultured in Mexico. There is major interest among the sector to provide adequate sources of protein that ensure their requirements for rapid growth and best quality. Tilapia is an omnivorous species that tolerates vegetable and other sources of protein. There is also interest to make its cultivation more sustainable with low cost protein sources and low waste of resources. *In vivo* trials for feed ingredients, necessary for diet formulations is a long and costful technique, so an *in vitro* technique was used to test the hydrolysis of several protein sources including: wheat, soybean texturized protein, chickpea, corn, pinto beans, rice, cricket, spirulin and a commercial diet. Proteases were extracted and partially purified from the intestine through ammonium sulfate precipitation and gel filtration chromatography, with a purification factor of 14.7 X and 17% yield. Specific activities of trypsin, chymotrypsin and several aminopeptidases were identified. Degree of hydrolysis of the ingredients and the commercial diet were determined using o-phthalaldehyde using the purified enzymes and a cocktail of commercial enzymes for comparison. In all cases there was a significantly higher estimation of degree of hydrolysis with the cocktail of commercial enzymes. Alternative sources used such as cricket and spirulina flours had higher values of degree of hydrolysis as well as soybean flour. The use of endogenous enzymes from Tilapia for the estimation of degree of hydrolysis and ultimately *in vitro* digestibility can lead to a better and more sustainable use of ingredients for feed formulations.

***Presenter**



PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

Ready About!

Title: Bringing Seaweed Safely to Market as Food

Authors: **Michael Ciaramella*** - New York Sea Grant - Cornell Cooperative Extension, Stephanie Otts and Catherine Janasie - National Sea Grant Law Center, Anoushka Concepcion - Connecticut Sea Grant

Abstract:

Introduction

There is an increasing interest in seaweed cultivation as a sustainable food and ecosystem service provider. For emerging producers to access the food market, it is important to understand the regulatory framework around seaweed processing and marketing and how to maintain and control potential food safety hazards.

Objectives

1) Enhance agency, academic, and industry understanding of seaweed as food and best practices for maintaining safety. 2) Develop resources and tools to support the safe and sustainable growth of a domestic seaweed industry.

Materials and Methods

NY Sea Grant, in collaboration with Connecticut Sea Grant and the National Sea Grant Law Center, has coordinated a group of food safety professionals to discuss seaweed food safety best practices and regulations.

Results and Discussion

Through these facilitated discussions the workgroup identified three major efforts to support the viable commercial expansion of this new industry. 1) Draft guidance to clarify the regulatory framework surrounding seaweed production. 2) Create a hazards and controls guide compiling scientific information on potential seaweed food safety hazards and their controls. 3) Develop a seaweed specific food safety training to support this emerging industry.

Conclusions

The initial regulatory guide was drafted and describes the similarities and differences between FSMA PC and Seafood HACCP, which have been applied to the sale of seaweed as foods on the federal and state levels. The workgroup is currently seeking funds to support the creation of a hazards and controls guide that will serve as the foundation for an effective food safety training program.

***Presenter**



PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

Ready About!

Title: Improperly Discarded Plastic Food Packaging

Presenter: Jack Cooper, Executive Director, Animal Digestible Food Packaging Initiative (ADFPI)

Abstract:

The goal of the Animal Digestible Food Packaging Initiative (ADFPI) is to encourage the food processing industry to establish and partially fund a public private partnership for the discovery of new food packaging materials that would be digestible by animals (farm animals as well as ubiquitous microbes).

A significant amount of plastic food packaging is “improperly discarded;” that is, it finds its way to land and waterways where it is left to naturally degrade into macro, micro and nano size plastic particles. And because Improperly Discarded Plastic Food Packaging (IDPFP) is a food industry science, public affairs and legislative/regulatory issue:

- Wildlife, including marine food sources, are exposed to IDPFP in their natural environment.
- Adverse biological effects of macro size plastic particles have been demonstrated.
- Adverse biological effect studies of micro and nano size plastic particles are underway; for some species, adverse biological effects have been demonstrated; currently, there are no known adverse human health effects from exposure to IDPFP from micro and nano size particles.
- Governments around the world are developing legislative and regulatory mandates to prevent the environmental release of IDPFP, including the concept of Extended Producer Responsibility (EPR) where producers are required to accept financial or physical responsibility for the treatment or disposal of discarded consumer products.
- Consumers are increasingly applying Environmental, Social, and Governance (ESG) factors to the companies from which they purchase consumer products and investors are applying ESG factors in their decision-making process.
- Lawsuits against companies for alleged false environmental claims are a concern.
- Recycling difficulties exist.
- There is constant social and mainstream media attention on this topic.



PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

Ready About!

Title: When Regulations Meet Food Trends

Presenters: **Rebecca Durkota**, Quality Assurance Label and Nutrition Specialist, Trident Seafoods; and **Anneloes Silvertand**, QA Label and Nutrition Specialist, Trident Seafoods

Abstract:

The seafoods industry has a lot of opportunities to market itself based on positives. Many products from the sector can be classified as healthy and marketed as a nutritious and balanced alternative to many other protein sources. However, there are challenges when doing. There are regulatory restrictions to making claims such as “healthy”. On top of that, food trends and consumer preferences are constantly evolving. During this presentation, we will discuss the challenges that we currently face, when it comes to marrying these opportunities and regulations.



PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

Ready About!

Title: Determining the Effectiveness of Comminution Methods for Cell Lysis of Fish Byproducts

Authors: Bryan C. Gaspich¹ *, Michael H. Penner¹, Jung Yeon Kwon^{1,2}

¹ Department of Food Science and Technology, College of Agricultural Sciences, Oregon State University, Corvallis, OR, USA

² Seafood Research and Education Center, Oregon State University, Astoria, OR, USA

Abstract:

Introduction

Protein extraction from seafood byproducts has long been an area of interest to commercial fishing. The byproducts can make up to 45 percent of the catch weight and contain large quantities of protein that can be made available for extraction. How the byproduct is prepared in research prior to protein extraction has varied over the last 50 years and this inconsistency could impact the subsequent results.

Objectives

This research is focused on how different fish byproduct comminution parameters such as instrument, treatment time, and volume affect cell lysis as measured by soluble protein, conductivity, protein size, and extracted sodium.

Materials & Methods

Proximate analysis was completed per AOAC methods. Instruments of comminution included rotor stator, blender, bead beater, sonicator, vortex mixing, baffled flask mixing. Soluble protein was measured using the Bradford assay. Conductivity was measured using a conductivity meter. Extracted protein size was evaluated by SDS-PAGE. Sodium measurements were analyzed through neutron activation analysis.

Results & Discussion

The results show that instrument and volume matter for protein extraction with the blender and its volumes above 500ml each making a significant difference. Comminution time in the blender beyond 30 seconds showed no significant difference. Conductivity was measured at each time interval and the slope of the increase in conductivity over time similarly matched that of the increase in protein concentration providing an alternative method to measure cell lysis during comminution.

Conclusion

The parameters used to comminute fish byproduct can have a significant impact on the amount of cell lysis generated to make cellular proteins solvent available for extraction.

***Presenter and Student Competitor**



PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

Ready About!

Title: Microplastics in Our Marine Environment

Presenter: **Dr. Lyda Harris**, Environmental Sustainability and Conservation Scientist,
Boeing

Abstract:

Microplastics (plastic < 5mm in size) are ubiquitous in our environment and living in the PNW, we encounter them in unexpected places. The Salish Sea experiences seasonal fluctuations in precipitation, river discharge, sewage overflow events, and tourism— all variables thought to have an impact on microplastic transport and concentrations. Through examining seasonality and animal life history traits, we can better understand where and how microplastics are most affecting important marine organisms, ecosystems, and communities.



PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

Ready About!

Title: Putting the Cold Squeeze on Shellfish-borne Viruses

Presenter: Dr. David H. Kingsley, US Dept. of Agriculture, Agricultural Research Service, Delaware State University

Abstract:

Introduction

High pressure processing (HPP) has now moved from commercial food processing obscurity to the mainstream. While its uses are quite diverse, including generation of cold pasteurized juices, ensuring safety of deli meats, and shelf-life extended guacamole, it is used on a limited basis by the oyster industry to facilitate the shucking process and to inactivate *Vibrio vulnificus*. The potential to inactivate pathogens while keeping foods raw is a key appeal for this technology. Foodborne viruses are especially difficult pathogens to inactivate since they are thermally- and chemically-resistant.

Objective

To nonthermally-inactivate viruses within shellfish

Materials and Methods

Shellfish and viruses were treated by high pressure processing for various times, temperature and pressure. Inactivation was judged by plaque assay in vitro or, in the case of human norovirus, in vivo.

Results and Discussion

Research by the USDA ARS and collaborators has focused on evaluation of the potential of HPP to inactivate norovirus. Our research has identified HPP conditions that can inactivate these viruses as well as permit HPP to be effective at reduced pressures. Furthermore we have demonstrated that oysters treated under HPP conditions known to inactivate virus inactivation do taste good as judged by a volunteer consumer preference panel.

Conclusions

HPP oysters do taste good and can be rendered virus-free.



Title: Antioxidant, antimutagenic, and antiproliferative properties of pigment extracts from *Octopus vulgaris* skin

Authors: Adriana Isabel Cañez-Zuñiga^a, Carmen María López-Saiz^a, Wilfrido Torres-Arreola^a, Idalia Osuna-Ruiz^b, **Josafat Marina Ezquerro-Brauer^{a*}**

^aDepartamento de Investigación y Posgrado en Alimentos, Universidad de Sonora, Hermosillo, Sonora, México

^bUniversidad Politécnica de Sinaloa, Mazatlán, Sinaloa, México

Abstract:

Marine by-products such as *Octopus vulgaris* skin could be source of bioactive compounds. Ommochromes, are pigments in the skin of *O. vulgaris* that have such bioactive properties. This study aimed to evaluate the chemical structure, antioxidant, antimutagenic, and antiproliferative properties on cancer cells line of methanol-HCl skin extracts from *O. vulgaris* (OVE). The electrophoresis, UV-Vis, FTIR, and ¹H NMR analyses suggest xanthommatin, and compounds associated with proteins as the main components of the OVE. DPHH, ABTS, and FRAP assays indicated that the extracts possess free radical-scavenging capacity and reducing power. The inhibitory capacity on AAPH and the antimutagenic activity against sodium azide on the TA100 strain of *Salmonella* ser. Typhimurium indicated that the extracts exert protective activity in human cells and contain compounds with chemoprotective properties to reduce the mutagenicity of sodium azide. ARPE-19 cell line did not diminish, indicated that OVS did not exert a toxic effect against human cells. Although the cytoprotective capacity against the proliferation of cancer cells (prostate 22Rv1, breast MDA-MB, cervical HeLa, and lung A549) was lower, an *in silico* analysis predicted xanthommatin affinity with MDA-MB-231 cells, the obtained results suggested that octopus's skin crude extracts compounds are candidates for further purification investigations as possible chemoprotective agents.

***Presenter**



Title: Multi-Mode Spectroscopy Analysis of Fish Species and Quality

Authors: Mitchell Sueker¹, Amirreza Daghighi², Rosalee Hellberg³, Amanda Tabb³, Fartash Vasefi², **Nicholas MacKinnon**^{2*}, Greg Bearman² and Hossein Kashani Zadeh^{1,2}

¹University of North Dakota, Grand Forks, ND

²SafetySpect, Grand Forks, ND

³Chapman University, Orange, CA

Abstract:

Seafood is subject to widespread mislabeling and close to half of harvested fish is wasted due to challenges in evaluating freshness. We present development of a fast, non-destructive, and easy-to-use handheld multimode spectroscopic system for fish species identification and quality assessment. It uses the fusion of visible near infra-red (VIS-NIR), short wave infra-red (SWIR) reflectance and fluorescence (FL) spectroscopy. The instrument has four data modes; fluorescence with 365 nm and 395 nm excitations, diffuse reflectance in the visible range of ~450-950 nm and SWIR reflectance covering ~900-1700 nm with a tungsten bulb illumination source. The device is compact, battery operated and takes all the spectral data in a fixed sequence that takes seconds. The data provides the ability to classify along four separate axes; species identification, freshness assessment, farmed vs wild caught and frozen-then-thawed vs fresh. For the species identification, ground truth is DNA sequencing and for freshness assessment the number of days after catch. We used large datasets as inputs in AI learning prediction and developed a submodel technique to identify the species of fish fillets and applied it to 44 fish types. We also predicted fish freshness within +/-1 day with 95%+ accuracy for 4 fish species and observed promising features that distinguish farmed from wild salmon. Results show multimode spectroscopy significantly improves the accuracies of the stand-alone FL, VIS-NIR and SWIR single-mode spectroscopies across all four axes. The AI models can be run on the device with edge computing after training on a cloud processor.

***Presenter**



PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

Ready About!

Title: The View from the Water: Fishing Industries Respond to Offshore Wind Energy Development

Presenter: **Heather Mann**, Executive Director, Midwater Trawlers Cooperative

Abstract:

The rush to install several hundred floating wind turbines off the West Coast has many Americans concerned with impacts. While displacement from historic fishing grounds is a primary concern for the commercial and recreational fishing industries, significant questions remain unanswered with respect to impacts on the marine environment, endangered sea birds and marine mammals, and food security. Pitting renewable energy against sustainable food production is a no-win situation unless authentic collaboration is part of the equation. This talk will focus on how the commercial and recreational fishing industries are responding to offshore wind energy development on the West Coast.



PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

Ready About!

Title: Museum specimens reveal 90 years of change in *Contracaecum* spp. in Puget Sound, Washington

Authors: Natalie C. Mastick^{1, 2*}, Rachel L. Welicky^{1, 3}, Whitney C. Preisser¹, Katie L. Leslie¹, Katherine P. Maslenikov^{1, 5}, Luke Tornabene^{1, 5}, John M. Kinsella⁶, Timothy E. Essington¹, Chelsea L. Wood¹

1. School of Aquatic and Fishery Sciences, University of Washington, Seattle, WA.

2. Oceans Initiative, Seattle, WA.

3. Unit for Environmental and Sciences Management, North-West University, Potchefstroom, South Africa.

4. Ecology and Evolutionary Biology, University of California, Irvine, Irvine, CA.

5. Burke Museum Ichthyology Collection, University of Washington, Seattle, WA.

6. Helm West Laboratory, Missoula, MT.

Abstract:

Introduction

Parasites can negatively impact marine mammal health and, as the oceans change, the risk of infection is probably changing as well. Despite the likelihood that infection risk is changing, we don't know how parasitic infections have changed for marine mammals. Nematodes in the family Anisakidae are frequently found in the gut of marine mammals and can reduce host fitness. Recent studies have revealed a global trend of increasing anisakid abundance, but trends are unknown in the northeastern Pacific. Rising anisakid burdens could pose a threat to many marine mammal species, but especially those facing multiple stressors.

Objectives

We sought to determine how anisakid risk has changed over the past 90 years in Puget Sound, Washington by conducting parasitological analysis of museum specimens of common marine mammal prey species.

Materials and Methods

We dissected a representative sample of five fish species collected in Puget Sound since 1928. We identified all nematodes found within the fish to the genus level and used both generalized linear mixed-effects models and a state-space model to assess the relationship between parasite abundance and time.

Results and Discussion

Our results suggest declining anisakid abundance in Puget Sound over the past 90 years, with an increase in abundance in the Strait of Juan de Fuca since 1970. This regional trend suggests that the previously reported global trend might be a recent recovery from long-term decline.

Conclusion

Our findings suggest that Puget Sound marine mammals are probably less burdened by anisakids than they were historically, but recent regional anisakid recovery could impact definitive host health.

***Presenter and Student Competitor**



PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

Ready About!

Title: Biofunctionalities of Seaweed Hydrolysates and Synthetic Peptides from Pacific Dulse (*Devaleraea mollis*): An *in vitro* and *in silico* Prospecting Approach

Authors: Rufa L. Mendez^{1,3*} and Jung Yeon Kwon^{1,2}

¹Department of Food Science and Technology, College of Agricultural Sciences, Oregon State University, Corvallis, OR 97331

²Seafood Research and Education Center, Oregon State University, Astoria, OR 97103

³Zamboanga State College of Marine Sciences and Technology, Zamboanga City, Philippines 7000

Abstract:

Seaweed nutraceuticals have gained significant research and market interest over the years. While health-promoting bioactive hydrolysates (BAHs) and peptides (BAPs) have been reported using *in vitro* and *in vivo* models for hypertension and diabetes, there is limited work on inflammation, which is a recognized driver for disease progression. Since BAP discovery pipeline can be costly and labor-intensive, we employed a prospecting approach to scope out candidate BAHs and BAPs from the seaweed Pacific Dulse (*Devaleraea mollis*) using *in silico* approach followed by *in vitro* bioactivity validation. Dulse hydrolysates prepared with simulated gastrointestinal digestion, koji treatment, and bromelain hydrolysis exerted anti-inflammatory and enzyme-inhibitory activities against human dipeptidyl peptidase (DPPIV) and angiotensin-converting enzyme (ACE1). Dulse-associated synthetic peptides 13 (NNPTTIKPSAQVW), 14 (VLPNTVFEAVVK), and 17 (HMYKTNWG) inhibited nitric oxide and interleukin 6 production, and downregulated inflammatory gene expression in LPS-stimulated murine macrophages (RAW 264.7) *in vitro*. These results suggest that bioactive hydrolysates and peptides can be generated from the seaweed Pacific Dulse, posing promise for both the seaweed and health industry.

***Presenter**



PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

Ready About!

Title: The History of PFT: A Look at How PFT Started and Where We Are At

Presenter: **Bruce Odegaard**, Vice President of Product Services, Seafood Products Association

Abstract:

Professor, entrepreneur and possibly the most interesting man in the world, George M. Pigot, compiled the history of the first 50 years of PFT and we have a copy of every program since. PFT continues to provide a medium for the exchange of technical and scientific information among fisheries technologists, and those interested in fisheries technology, and the fisheries industry.



PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

Ready About!

Title: Elevated Histamine Levels Found in Salted Canned Anchovies:
Review of Recall Filed with USFDA (November 2022)

Authors: Alexandra Marques de Oliveira^{1*}, Alissa Umemoto¹, Yadwinder Singh Rana¹, William Soto¹, D. Mona Baumgartel² and John DeBeer².

¹Chicken of the Sea International (COSI), El Segundo, CA, 90245, USA

²Retired & Consultant for COSI.

Abstract:

Halophilic bacteria of the genus *Tetragenococcus* were isolated from cans of salted anchovies air packed in extra virgin olive oil (EVOO), sampled from commercial production manufactured by a supplier in Peru for Chicken of the Sea International (COSI). *Tetragenococcus* spp. have been demonstrated to thrive during fermentation of salted foods such as fish sauce and anchovies at salt concentrations above 20% and temperatures above 10°C. Given adequate growth conditions, these bacteria can produce gas and elevated amounts of histamine in their late stages of cell development.

COSI's foreign suppliers of salted canned anchovies do not list histamine formation in processed finished product in their HACCP plan as a required critical control point during distribution, storage, and consumption by consumers. The elevated histamine formed in the finished product triggered our filing of Class II recall. Evidence was submitted to the USFDA demonstrating that despite level of histamine being below 10 ppm up until products departed the manufacturing facility, at the time they entered US commerce these cans of anchovies were swollen, and histamine levels were up to 4-fold the regulatory limit (50 ppm).

During this presentation, the reasons for the recall and potential control strategies to prevent histamine formation in the finished product will be discussed. Histamine levels were also determined for samples of eight brands of canned salted anchovies purchased from groceries stores. We will use these results to substantiate the need to keep this product refrigerated (<10°C) throughout the supply chain, including at points of sale and consumers' homes.

***Presenter**



PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

Ready About!

Title: OSU Surimi School: Past and Future

Presenter: **Dr. Jae Park**, Professor Emeritus, Seafood Research & Education Center, Oregon State University (OSU)

Abstract:

For over 900 years, surimi seafood has been a delicacy made by Japanese cooks, who created this seafood product using surimi made from fish fillets which are often from underutilized species. In 1959-1960, a Japanese chemist discovered that surimi could be stabilized and frozen with the addition of sugar, which subsequently launched a fleet of Japanese factory ships ready to process the product en masse. But it was not until the mid-1980s to early 1990s when the Japanese surimi industry made its way to the United States for joint ventures in Alaska and Oregon, respectively. And it was in 1993 that Dr. Jae Park started the OSU Surimi School, an annual event at the OSU's Seafood Lab in Astoria, OR.

The goal of the OSU Surimi School has been to build a bridge between the industry and academia by teaching and certifying those working on the front lines of surimi and surimi seafood processing, by inviting speakers from industry, government agencies, and scientists who present about the bigger issues of supply, demand, and the development of new products. And as this humble seafood product has evolved over the years, so has the OSU Surimi School in order to accommodate this beloved industry.



PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

Ready About!

Title: NOAA Fisheries' Role in Offshore Wind Energy Development on the West Coast

Presenter: **Dr. Lisa Pfeiffer**, Economist, Fisheries Resource Analysis and Monitoring Division, Northwest Fisheries Science Center

Abstract:

NOAA Fisheries is supporting the administration's goal of deploying 30 GW of offshore wind energy by 2030 while protecting biodiversity and promoting ocean co-use through:

- 1) Regulatory authorizations and environmental review,
- 2) Providing science, data, and other services to inform BOEM's decision-making on offshore wind siting and other decisions, and
- 3) Engaging with State, Federal, and Tribal governments as well as stakeholders, including fishermen

While BOEM is the lead on offshore energy development under the Outer Continental Shelf Lands Act, NOAA mission, expertise, and responsibilities are key to successfully meeting clean energy goals. In this talk we'll cover each of the three main areas within NOAA Fisheries' mission. We'll also describe the work the NOAA Fisheries West Coast is actively doing, including the implementation of Offshore Wind Energy Coordination Team, working on the mitigation of impacts to NMFS scientific surveys, and developing a strategic science plan for offshore wind.



Title: Superheated steam effectively inactivates diverse microbial targets despite mediating effects from food matrices in bench-scale assessments.

Authors: Yadwinder Singh Rana^{1*}, Long Chen¹, V.M. Balasubramaniam², Abigail B. Snyder¹

¹Department of Food, Science, Cornell University, Ithaca, NY, 14853, USA

²Department of Food Science and Technology, The Ohio State University, Columbus, OH, 43210, USA

Abstract:

Sanitation in dry food processing environments is challenging due to the exclusion of water. Superheated steam (SHS) is a novel sanitation technique that utilizes high temperature steam to inactivate microorganisms. Here we evaluated SHS thermal inactivation of various vegetative and spore forming bacteria and fungi and determined the effect of food matrix composition on SHS efficacy. Capillary tubes with vegetative cells, *Aspergillus fischeri* ascospores, or *B. cereus* spores (100 μ L) were SHS treated at 135 ± 1 °C for 1 or 2 s. After 1 s, SHS achieved a significant reduction ($p < 0.05$) for vegetative cells ($10.91 \pm 0.63 \log_{10}$ CFU/mL), and *Aspergillus fischeri* ascospores ($2.09 \pm 0.58 \log_{10}$ ascospores/mL), and a non-significant reduction for *B. cereus* spores ($0.21 \pm 0.10 \log_{10}$ spores/mL). Consequently, peanut butter compositions and milk powders inoculated with *B. cereus* spores on aluminum foil coupons (2 x 3 x 0.5 cm) were tested. The D_{161} °C values for *B. cereus* spores ranged from 46.53 to 79.21 s for various peanut butter compositions. Whole milk powder had higher D_{161} °C (34.38 ± 20.90 s) than nonfat milk powder (24.73 ± 6.78 s). *B. cereus* spore inactivation was significantly affected by product composition ($p < 0.05$). Finally, the ease of peanut butter removal from surfaces increased while the ease of non-fat dry milk removal decreased with the increasing SHS treatment duration. Allergen residues were detectable on surface regardless of SHS treatment. The findings from this study can inform the development of pilot-scale research on SHS.

*Presenter



Title: Competition Driving Innovation

Presenter: **Michaella Rogers**, Project Manager, XPRIZE Feed the Next Billion

Abstract:

At XPRIZE, we believe that the world needs crazy ideas. Solutions can come from anyone, anywhere on the planet; engineers, scientists, garage tinkerers, entrepreneurs, innovators, or citizen scientists. XPRIZE is a trusted, proven platform for impact that leverages the power of competition to catalyze innovation and accelerate a more hopeful future by incentivizing radical breakthroughs for the benefit of humanity.

In 2020, XPRIZE launched Feed the Next Billion, a \$15M competition that incentivizes teams from around the world to produce chicken breast or fish fillet alternatives that replicate or outperform conventional chicken and fish in: access, environmental sustainability, animal welfare, nutrition and health, as well as taste and texture. The solutions developed as a result of this competition will provide a more environmentally sustainable path to meeting emerging demand for meat products, while advancing food systems, and animal welfare.



PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

Ready About!

Title: Interactions of Offshore Wind Development and Fishery Industries

Presenter: **Dr. Kevin D. E. Stokesbury**, Commonwealth Professor, Department of Fisheries Oceanography, School of Marine Science and Technology, University of Massachusetts Dartmouth

Abstract:

Heavy development of offshore windfarms is occurring in Europe and along the Atlantic coast of the United States in response to the increasing demand for renewable alternative energy. Inevitably this development will overlap with fisheries. A wholistic framework needs to be developed to deal with the interactions between these industries. The framework should categorize data on spatial scales of 1 cm² to 1 km² (individual turbines/fishing vessels), 1 km² to 1000 km² (companies), and > 1000 km² (regions), and by their ecological, economic, cultural, and institutional impacts. The framework should be repeated over temporal scales of the windfarm: pre-development (1 to 3 years), construction (1 to 2 years) post-construction (20 to 40 years) and decommission. Balancing the metrics used to describe the two industries will allow people to communicate clearly in an organized systematic way, hopefully resulting in a continuing supply of sustainable sea food and renewable energy to an increasingly hungry world.



PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

Ready About!

Title: The impact of florfenicol treatment and rearing water temperatures on the microbial populations associated with catfish

Authors: Hongye Wang¹, Lina Sheng¹, Xiran Li¹, Zhuosheng Liu¹, Sushumna Canakapalli¹, Yi Zhou¹, Chao Liao¹, Esteban Soto Martinez², and **Luxin Wang^{1*}**

¹Department of Food Science and Technology, University of California Davis

²School of Veterinary Medicine, University of California Davis

Abstract:

Introduction

Microbiome associated with catfish and the rearing environment have significant impact on fish health and development. Bacterial infections in catfish are temperature dependent. Understanding the impact and interactions of medicated feed application and rearing water temperatures on the microbiota associated with catfish are critical for mitigating antimicrobial resistance.

Objectives

The objective of this study was to investigate the impact of therapeutical florfenicol treatment, rearing water temperature, and their interaction on the microbial populations present on catfish.

Materials & Methods

Twenty-four 35-gallon tanks were set at 20, 25, and 30 °C with 25 fish in each tank. Desired water temperatures were maintained by using heating probes. Five fish were taken from each tank before and after the antibiotic treatment as well as at the end of withdrawal period. Microorganisms present on fish gill and skin, and in the intestine were collected using FLOQSwabs. Their microbial compositions were analyzed by direct plating and 16S rDNA sequencing.

Results & Discussion

Rearing water temperatures, sampling sites, and their interactions significantly shaped the microbial compositions associated with fish samples. At the end of withdrawal, temperatures significantly impacted the alpha diversity (Shannon index) of the microbiome in fish intestine and the beta diversities of both gill and intestine samples. Genera, such as *Aeromonas*, *Novosphingobium*, *Plesiomonas*, and *Flavobacterium*, were identified as the most significant influential genera associated with florfenicol treatments.

Conclusion

This study showed that the impact of florfenicol treatment on microorganisms associated with catfish is site- and temperature-dependent.

***Presenter**



PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

Ready About!

Title: FDA's Food Traceability Rule; It's Time to Get Started

Presenter: **Lisa Weddig**, Vice President, Regulatory and Technical Affairs, National Fisheries Institute

Abstract:

The Food Safety Modernization Act (FSMA), signed into law 12 years ago, marked the most expansive change in food law since the 1938 Federal Food, Drug, and Cosmetic Act by providing FDA with new enforcement authorities and a mandate to focus on preventive controls rather than simply responding to food safety problems. Several of the major provisions had no relevance to the seafood industry as the successful Seafood HACCP regulation was seen by Congress as providing FDA with the preventive control tools needed to ensure the safety of domestic and imported seafood products. However, the last major FSMA rule to publish will greatly impact the entire seafood supply chain.

FDA implemented Section 204 of FSMA with the release of the final rule, [Requirements for Additional Traceability Records for Certain Foods](#), on November 21, 2022. FDA has granted industry three years to implement the provisions of the regulation with full compliance expected by January 20, 2026. Simply put, the final rule requires covered entities to do four things:

1. Develop and maintain a traceability plan;
2. Maintain records of Key Data Elements (KDE) associated with the applicable Critical Tracking Events (CTE);
3. Use a Traceability Lot Code to link CTEs;
4. Maintain and provide records to FDA when requested.

While three years to implement a traceability program seems like plenty of time, 2023 is the year to get started with understanding the requirements and mapping out a traceability plan.



PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

Ready About!

Title: Updates from the Seafood Inspection Program

Presenter: **Steven Wilson**, Chief, Seafood Inspection Program, National Marine Fisheries Services Office of International Affairs, Trade, and Commerce

Abstract:

A great many changes are underway for the operations of the Seafood Inspection Program. We are updating our regulations after 50 years and modernizing several methods as well as the U.S. Grade Standards for seafood products. The pandemic provided many learnings for inspection agencies and now that we are exiting that time changes to how our services are delivered are necessary. The requirements for approved establishments and vessels will be changing and the world of export certification and its paradigm are heavily modified. This presentation will touch on all this and more.



PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

Ready About!

Title: How safe is our packaging ? Understanding potential Food Safety hazards in packaging.

Presenter: **Clare Winkel**, Executive Manager – Technical Solutions, Integrity Compliance Solutions.

Abstract:

Objectives

To enable food safety professionals to be more aware of food safety hazards from packaging.

Materials and Methods

All food industry Quality Assurance professionals developing risk assessments/hazard analysis for food safety plans/HACCP plans needs to be aware of potential food safety hazards in the packaging that they are using so that they can document the risk and identify control measures to minimize the food safety risks. Packaging regulations across the world can be significantly different and sometimes in direct conflict.

Results & Discussion

Packaging is an essential input to processed food, but it can also be a source of many potential food safety hazards including:

- foreign objects.
- chemicals leaching into foods.
- growth conditions for pathogenic bacteria.
- taints & smells.
- unlabelled allergens.
- pesticide residues.
- heavy metals.
- selling food fraud.

Conclusions

Customer requirements and innovative new technologies can provide solutions but also a new range of problems.

New Product Development staff also need to be aware of the options and disadvantages of different packaging options available to them.

It is essential that food professionals know the end destination of their food and packaging, so that their packaging manufacturers can identify what chemicals/components can be used and not used within the packaging production process.



PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

Ready About!

Title: Sustainable Packaging to Protect Environment and Provide Consumer Convenience

Presenter: **Dr. Yanyun Zhao**, Associate Dean of Faculty Affairs, College of Agricultural Sciences; Professor, Department of Food Science & Technology, Oregon State University

Abstract:

Food packaging plays a significant role for protecting food across the food chain. It also communicates food with consumers and provides convenience to consumers. However, over packaging and some packaging materials, especially plastic packaging have caused significant impact on the environment and ecosystem. This presentation introduces sustainable packaging, gives examples of current sustainable packaging research and development, such as edible packaging to replace single use plastic packaging and compostable packaging created from food processing byproducts, and share perspectives in sustainable food packaging.



PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

Ready About!

Title: *In Silico* Prospecting for Novel Bioactive Peptides in *Crassostrea Gigas*

Authors: Leyi Zhou ^{1*}, Rufa L. Mendez ¹ and Jung Yeon Kwon ^{1,2},

¹ Department of Food Science and Technology, College of Agricultural Sciences, Oregon State University, Corvallis, OR, USA

² Seafood Research and Education Center, Oregon State University, Astoria, OR, USA

Abstract:

Introduction

Pacific oyster (*Crassostrea gigas*), an abundant bivalve consumed across the Pacific, is known to possess a wide range of bioactivities beyond its high nutritional value, and thus gaining tremendous research interest in their bioactive components and therapeutic potential. Oyster proteins have been shown to be good precursors of bioactive peptides, which may be effectively released by the human digestion process.

Objective

This study aimed to develop an *in silico*-based prospecting framework to accelerate bioactive peptide (BAP) discovery and screening, as the existing pipeline is time and resource-intensive.

Methods

Existing platforms and tools were carefully vetted to identify advantages and limitations to avoid potential pitfalls in filtering. Major oyster proteins were digested virtually under simulated gastrointestinal condition to generate virtual peptide products that were screened against existing databases and Machine Learning-based predictive models for specific bioactivities, toxicity, bitterness, stability in the intestine and in the blood, and novelty.

Results and Discussion

Five peptide candidates were shortlisted respectively, showing antidiabetic, anti-inflammatory, antihypertensive, antimicrobial, and anticancer potential. Amino acid compositions, physicochemical properties, and peptide-protein interactions of the top candidate peptides patterns strengthened predictions.

Conclusion

C. gigas is a rich source of bioactive peptides accessible by digestion, with opportunities in functional food and nutraceutical applications. By employing our approach, oyster BAPs were identified at a faster rate, with a wider applicability reach. With the growing market for peptide-based nutraceuticals, this provides an efficient and adaptive workflow for candidate scouting and end-use investigation for targeted functional product applications from nutritious seafood and beyond.

***Presenter and Student Competitor**



POSTER ABSTRACTS



Title: The greening reaction of skipjack tuna (*Katsuwonus pelamis*) metmyoglobin promoted by free cysteine during thermal treatment

Authors: Andrés Álvarez-Armenta^{1*}, Ramón Pacheco-Aguilar¹, Alonso A López-Zavala², David O Corona-Martínez², Rogerio R Sotelo-Mundo³, Karina D García-Orozco³, Juan Carlos Ramírez-Suárez¹

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³Laboratorio de Estructura Molecular, Tecnología de Alimentos de Origen Animal, Centro de Investigación en Alimentación y Desarrollo, A. C., Hermosillo, Sonora, México.

Abstract:

Tuna greening muscle is a pigmentation anomaly promoted by thermal treatment. Previous research suggested this discoloration problem was the result of disulfide bond formation between Cys-10, conserved residue on tuna myoglobin (Mb), and free cysteine (Cys), promoted by the presence of trimethylamine oxide (TMAO). However, we used a purified metmyoglobin (MetMb) from skipjack tuna (*Katsuwonus pelamis*) muscle to evaluate the Cys (1–6 mM), TMAO (1.33 mM) and catalase on the greening reaction (GR) monitored by UV-vis spectrometry (610 nm) during heat treatment (60 °C/30 min). Additionally, Cys-10 participation in GR was evaluated after its blocking with N-ethylmaleimide. GR was the product of sulfmyoglobin (SulfMb) formation that was produced from the reaction between tuna MetMb and Cys during heat treatment and occurred regardless of TMAO presence. However, rate constants observed of SulfMb production depended on Cys concentration (up to 4 mM). We observed the formation of an intermediary spectrum (Q bands around 545 and 580 nm) characteristic of ferrylmyoglobin, promoted by the presence of O₂[•] and H₂O₂, suggesting that the GR is a consecutive reaction, with a subsequent SulfMb production. Moreover, Cys-10 residues in tuna Mb are not involved in the GR since this reaction occurred even with blocked Cys-10 and horse Mb (without cysteine residues in its sequence). We established that GR is not exclusive to tuna Mb's and it can be promoted in other muscular systems. Moreover, the formation of free radicals from Cys oxidation during heat treatment is determinant for promoting this pigmentation anomaly.

***Presenter**



Title: N-(2-ozoazepan-3-yl)-pyrrolidine-2-carboxamide, a bioactive compound found in *Octopus vulgaris* ink, exhibits antiproliferative and pro-apoptotic effect on human cancer cell lines

Authors: Armando Burgos-Hernández^{1*}, Martín Samuel Hernández-Zazueta¹, Joel Said García-Romo¹, Ivan Luzardo-Ocampo², Ángel Antonio Carbonell-Barrachina³, Pablo Taboada-Antelo⁴, Ema Carina Rosas-Burgos¹, Josafat Marina Ezquerro-Brauer¹, Juan Manuel Martínez-Soto⁵, María del Carmen Candia-Plata⁵, and Hisila del Carmen Santacruz-Ortega⁶

¹ Departamento de Investigación y Posgrado en Alimentos, Universidad de Sonora, 83000 Hermosillo, Sonora, México.

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⁵ Departamento de Medicina y Ciencias de la Salud, Universidad de Sonora, 83000 Sonora, México.

⁶ Departamento de Investigación en Polímeros y Materiales, Universidad de Sonora, 83000, Sonora, México.

Abstract:

Recently, N-(2-ozoazepan-3-yl)-pyrrolidine-2-carboxamide (OPC) was isolated from *Octopus vulgaris* ink and evaluated for antiproliferative activity. OPC was found to inhibit the proliferation of several human cancer cell lines; therefore, was chemically synthesized for further studies. The aim of the present study was to assess the antiproliferative and pro-apoptotic activity of synthesized OPC. OPC was found to reduced proliferation of human breast (MDA-MB-231), prostate (22Rv1), cervix (HeLa), and lung (A549) cancerous cells, showing the highest effect on the latter (IC₅₀: 53.70 μM). Using fluorescence microscopy, synthesized OPC demonstrated morphological changes on A549 cells, typical of those associated to apoptosis, it was then confirmed by flow cytometry analyses, where early and late apoptosis stages were detected. Results suggested that synthesized OPC has the potential to be proposed for further studies as a potential chemotherapeutic agent. Marine-derived food products such as ink contains bioactive metabolites exhibiting potential health benefits.

***Presenter**



PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

Ready About!

Title: Lipidic compounds from the muscle of white shrimp (*Litopenaeus vannamei*): chemical structure and effect on the proliferation and morphology of human cancer cell lines

Authors: Sandra Carolina De La Reé Rodríguez^{1*}, Carmen María López-Saiz¹, Josafat Marina Ezquerro- Brauer¹, Hisila Del Carmen Santacruz-Ortega², Maribel Plascencia-Jatomea¹.

¹Departamento de Investigación y Posgrado en Alimentos, Universidad de Sonora.

²Departamento de Investigación en Polímeros y Materiales, Universidad de Sonora.

Abstract:

Cancer represents the second leading cause of death worldwide, therefore, the search for chemoprotective agents is on the rise. The muscle of white shrimp (*Litopenaeus vannamei*) has been reported as a source of compounds with antiproliferative activity. The aim of this study was to evaluate the effect of isolated compounds from shrimp muscle on the proliferation and morphology of human cancer cell lines. The muscle underwent a process of extraction and fractionation of compounds; their effect on cell viability assays (MTT) on lung adenocarcinoma (A549), prostate carcinoma (22 Rv-1), invasive breast adenocarcinoma (MDA MB 231), colon carcinoma (HTC 116), cervix adenocarcinoma (HeLa) and non-cancerous retinal cells (ARPE-19) was measured. Morphological changes were observed using fluorescence microscopy and chemical structure data was obtained using nuclear magnetic resonance. Fraction named C5 showed the highest antiproliferative activity on HCT-116 ($39.93 \pm 11.18\%$ of viability) and MDA-MB- 231($36.88 \pm 6.85 \%$), without significantly affecting the control cells. Subfractions C5-3 and C5-4 presented significant antiproliferative potential in MDA-MB-231(14.12 ± 4.44 and $18.42 \pm 4.86 \%$ viability respectively); this cell line showed morphological changes that could be related to apoptosis, and spectroscopic analysis revealed the presence of b-carotene, eicosapentaenoic acid, and docosahexaenoic acid in both sub-fractions, nevertheless, further studies are needed to determine the effect of each compound.

***Presenter and Student Competitor**



PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

Ready About!

Title: Optimization of DNA-based methods for the detection of canned tuna species

Authors: Aubrey Emmi*, Biola Fatusin, Rosalee S. Hellberg

Chapman University, Schmid College of Science and Technology, Food Science Program, Orange, CA

Abstract:

Tuna is susceptible to species mislabeling due to its high demand, quick rate of production, and wide range of price points. DNA barcoding, a sequencing-based technique, allows for the detection of species mislabeling by targeting a standardized region of DNA. A mitochondrial control region (CR) DNA barcode has been found to be capable of species discrimination for tuna, but it is challenging to recover from canned tuna. While a short fragment of CR, referred to as a 'mini-barcode', has shown some success with canned tuna species identification, more research is needed to improve identification rates. The objective of this study was to determine the optimal DNA extraction method for species identification of canned tuna using CR mini-barcoding. Four commercial DNA extraction kits were compared using a sample set of 24 different cans of tuna labeled as albacore, light tuna, skipjack, or yellowfin. All samples were tested in duplicate. The greatest success was found with the Qiagen DNeasy Blood and Tissue Kit and the Qiagen DNeasy *mericon* Food Kit, which resulted in species identification for 42% of samples. In comparison, the MP-Biomedicals Fastprep-24 + Machery-Nagel Nucleospin Tissue Kit resulted in species identification for 30% of samples and the Qiagen DNeasy Blood and Tissue Kit + PowerClean Pro Cleanup Kit resulted in species identification for 21% of samples. Overall, the top-performing DNA extraction methods for use with CR mini-barcoding of canned tuna products were determined to be the DNeasy Blood and Tissue Kit and the DNeasy *mericon* Food Kit.

***Presenter and Student Competitor**



Title: Evaluation of *Octopus vulgaris* and *Dosidicus gigas* skin pigment extracts as an antioxidant and preservative in chicken burger

Authors: Esparza-Espinoza Dania Marisol^{1*}, José-Luis Cárdenas-López¹, Ángel-Antonio Carbonell-Barrachina², and Ezquerra-Brauer Josafat Marina¹

¹ Departamento de Investigación y Posgrado en Alimentos, Universidad de Sonora, Blvd. Luis Encinas y Rosales s/n, C.P. 83000, Hermosillo, Sonora, México.

² Departamento de Tecnología Agroalimentaria, Escuela Politécnica Superior de Orihuela, Universidad Miguel Hernández de Elche, Alicante, España.

Abstract:

Poultry-based products, such as chicken burger, are food items of great economic and nutritional importance. However, during their storage, lipid oxidation and microbial growth lead to quality losses. Although synthetic antioxidant and synthetic antimicrobial additives are effective, there is certain issues regarding their negative impacts on human health. Therefore, there is a popular demand for replacing synthetic additives with natural compounds. Seafood by-products, like cephalopod skin pigments, can be used to improve the shelf life of foods. In this work, a strategy for poultry food preservation, based on methanol-HCl extracts from *Octopus vulgaris* (OVE) and *Dosidicus gigas* (DSE) skins were evaluated at two concentrations (0.05 and 0.1 %) on a breast chicken burger model, which were stored at 4 °C for 12 days. During a 12-day storage period, lipid oxidation, microbiological analysis, and sensory quality attributes were evaluated, and the results were compared with those of α -tocopherol and control (without OVE and DSE) treatments. COSY analysis indicated that the main compounds in pigments extracts are xanthommatin, dihydroxantommantin, and kynurenine. The highest *in vitro* antioxidant activities were detected in OVE. OVE-0.05- and DGE-0.05-treated burgers maintained lower pH values, were less sensitive to lipid oxidation, showed delayed bacterial contamination, and preserved the sensory quality attributes, unlike control burgers. OVE remarkably induced the strongest inhibition of lipid oxidation, whereas DGE completely inhibited mold and yeast growth. The kynurenine proportion and amino-aromatics compound in the H¹-NMR spectra may explain the differences in OVS and DGS bioactive properties. This study suggested that OVE and DGE pigments has biological compounds that can act as antioxidant and antimicrobials agents.

***Presenter and Student Competitor**



Title: Protein identification of skate (*Raja Kenojei*) muscles fermented under anaerobic conditions with vacuum by LC-MS

Authors: A-Hyeon Kim, Suk-Min Yun, **Jong-Bang Eun***

Department of Integrative Food, Bioscience and Biotechnology, Graduate School of Chonnam National University, Gwangju 61186, Republic of Korea

Abstract:

Fermented skate is popular in S. Korea, especially in the Southwest area. Although the color of fermented skate muscle is considered as the one of indicators for better product quality, no study has been conducted on the color change of skate muscle depending on fermentation conditions. Therefore, the aim of this study is to investigate color change of post-mortem skate muscle during fermentation by proteomic analysis. The proteomic analysis including 1-DE and 2-DE followed by protein identification with LC-MS/MS was conducted at the anaerobic conditions with vacuum on protein in skate muscle. The skate wings were fermented for 15 days at 10 °C. The skate wings fermented under anerobic conditions with vacuum was abbreviated as AC-S and the skate wings with non-treatment were used as a control. The skate muscles were analyzed for protein patterns by SDS-PAGE, and protein with molecular weights of 10–250 kDa were observed. Each 500 µg of skate muscle protein was loaded in a large gel and the proteins were separated according to the pH range. Sixteen specific protein spots were isolated in the 2-DE analysis and some of them were identified as myosin, keratin, actin, albumin, serine/arginine matrix, trypsin, and parvalbumin, respectively. Additionally, the intensity of the spots identified as enzymes including creatine kinase M-type, B-type, glyceraldehyde-3-phosphate dehydrogenase, and NADP-specific glutamate dehydrogenase- like was changed depending on the atmosphere conditions during fermentation. The further research is required to investigate the correlation between color and the related enzymes in the future.

***Presenter**



PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

Ready About!

Title: Influence of a phytochemical compound on digestive carboxylesterases from penaeid shrimps (*Litopenaeus vannamei* and *Litopenaeus stylirostris*)

Authors: Dayne Darlen Lezama-Balderrama^{1*}, Lourdes Mariana Díaz-Tenorio¹, Luis Alonso Leyva-Soto¹, Tania Díaz-Vidal², Raúl Balam Martínez-Pérez¹

¹Departamento de Biotecnología y Ciencias Alimentarias, Instituto Tecnológico de Sonora, Ciudad Obregón, Sonora, México

²Departamento de Ingeniería Química, Universidad de Guadalajara, Guadalajara, Jalisco, México

Abstract:

Introduction

As part of the ongoing formulations in aquaculture, plant protein sources are used as an alternative to animal-based feedstocks, although these ingredients present diverse phytochemicals (ferulic acid, caffeic acid, and gallic acid, among others); in mammals, some of these phytochemicals can intervene in the activity of lipolytic digestive enzymes.

Objective

To evaluate the effect of hydroxybenzoic acid (gallic acid) on the digestive lipolytic enzymes from penaeid (*Litopenaeus vannamei* and *Litopenaeus stylirostris*).

Materials and methods

The bioactivity activity of gallic acid (GA) predicted by PASS online for enzymatic inhibition. Lipolytic activity was determined by spectrophotometric assays using p-nitrophenol esters and triglycerides. Digestive enzymes from two penaeids (*Litopenaeus vannamei*; LV and *Litopenaeus stylirostris*; LS) were exposed at two times of incubation (1 h and 2 h) with 5 mM of GA in dimethyl sulfoxide or methanol. Zymograms were performed to evaluate lipase/esterase and proteinase activity. Protein-ligand docking and molecular interaction were performed using AutoDock Vina (VERSION 1.5.6) and Discovery Studio software (VERSION 21.1.0.20298).

Results and discussion

The GA showed carboxylesterase, phospholipase, and lipoprotein lipase inhibitor activity. LV lipolytic activity was inhibited by over 70% at 2 h, while LS decreased its activity to 38.8% at 2 h. Two and one principal lipolytic enzymes were identified in LS and LV, respectively, whereas only one true lipase was identified for both organisms. Molecular docking with GA showed interaction with catalytic serine and aside binding pocket.

Conclusion

This study provides an insight into the effect of gallic acid on digestive lipolytic activity in shrimps.

***Presenter and Student Competitor**



Title: Effect of Astaxanthin and Eicosapentaenoic Acid extracted from White Shrimp (*Litopenaeus vannamei*) on Prostate Cancer Cell Cycle Arrest

Authors: Carmen María López-Saiz^{a*}, María de Guadalupe Ruiz-Almada^b, María Guadalupe Burboa-Zazueta^b, Edgar Sandoval-Petris^b, Hisila Santacruz-Ortega^c, María del Carmen Candia-Plata^d, Rocío Campos-Vega^e, Armando Burgos-Hernández^a

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^d Departamento de Medicina. Universidad de Sonora. Hermosillo, Sonora, México.

^e Facultad de Química. Universidad Autónoma de Querétaro. Querétaro, México.

Abstract:

Cancer is a chronic-degenerative disease that occupies one of the first places in incidence and mortality worldwide. In the search for alternative treatments, the presence of cancerous cell-specific antiproliferative compounds in *Litopenaeus vannamei* has been studied, however, they are still scarce. The aim of this study was to contribute to the understanding of the mode of action of this type of compound, assessing cell cycle and characterizing the bioactive molecules. Shrimp fraction with the highest antiproliferative activity was evaluated on 22Rv1-, HeLa-, and MDA-MB-231-cancerous cell line, as well as on ARPE-19-noncancerous cell line. The highest cytotoxic activity (IC₅₀ de 35.96 ± 1.70 µg/mL) was observed on 22Rv1 having no effect on ARPE-19 cells. From the most active fraction, yellow-colored 4.1, and orange-colored 4.2 sub-fractions were obtained. Chemical-structural characterization of these sub-fractions demonstrated the presence of astaxanthin, EPA and dioctyl-phthalate. After being assessed by the MTT assay, IC₅₀ = 64.15 and 61.30 µg/mL for sub-fractions 4.1 and 4.2, respectively. The capacity of 4.1 and 4.2 sub-fractions of causing cellular arrest at G₀/G₁ stage of 22Rv1 cells was demonstrated by flow cytometry. Antiproliferative activity of these fractions might be attributed to the presence of astaxanthin and EPA, suggesting a synergistic effect, however, further studies are needed for a full assessment.

*Presenter



Title: Thermal inactivation of *Listeria monocytogenes* in ready-to-eat crabsticks

Authors: S.Y. Park^{1,2}, E.B. Jeon¹, C. DeWitt², and J.W. Park^{2*}

¹Institute of Marine Industry, Department of Seafood Science and Technology, Gyeongsang National University, Tongyeong 53064, Republic of Korea

²OSU Seafood Lab, Oregon State University, Astoria, OR 97103, USA

Abstract:

Crabsticks, which is globally popular due to good taste, convenience, and affordable price, are heat-pasteurized to inactivate or inhibit psychotropic *Clostridium botulinum* types B and E and *Listeria monocytogenes*. The U.S. surimi seafood industry, which has been using higher temperature and longer pasteurization compared to other countries, needs a milder, but effective pasteurization procedure. Due to the complicated lab safety for the study using *C. botulinum*, *L. monocytogenes* was selected as a target organism in this particular study. The effects of 85 and 90°C for 0.5-15 min were examined using crabsticks experimentally contaminated with *L. monocytogenes*. The effect of sequential treatments (67°C/5 min, 67°C/5 min+72°C/1 min, and 67°C/5 min+72°C/1 min+75°C/1 min) was studied. Log₁₀ CFU/g of *L. monocytogenes* was gradually reduced to 0.56-5.89 and 0.81-7.97 at 85°C and 90°C for 0.5-15 min, respectively. Sequential treatments at 67°C/5 min, 67°C/5 min+72°C/1 min, and 67°C/5 min+72°C/1 min+75°C/1 min significantly reduced log₁₀ CFU/g to 1.03, 1.89, and 4.96, respectively. The Weibull model was used to calculate 6-log reductions (D=6) of *L. monocytogenes* in the crabsticks (R² = 0.99) at the geometric center at 85°C (R²=0.99) and 90°C (R²=0.97). The D=6 values predicted at 85°C and 90°C were 15.08 and 10.15 min, respectively. These results of thermal single and sequential treatments may provide basic data for a future study using *C. botulinum* for the US surimi seafood industry. However, future experiments are suggested to include the thermal treatments affecting the physicochemical, nutritional, and sensorial quality based on the consumer's demand.

*Presenter



Title: Low molecular weight components present in jumbo squid (*Dosidicus gigas*) muscle and its myofibrillar protein protection against denaturation and/or aggregation during frozen storage

Authors: Juan Carlos Ramírez-Suárez*, Ramón Pacheco-Aguilar, Susana María Scheuren-Acevedo, Guillermina García-Sánchez, Gisela Carvallo-Ruiz, Andrés Álvarez-Armenta.

Laboratorio de Bioquímica y Calidad de Productos Pesqueros, Tecnología de Alimentos de Origen Animal, Centro de Investigación en Alimentación y Desarrollo, A.C., Carretera Gustavo E. Astiazarán Rosas, No. 46, Col. La Victoria, CP. 83304. Hermosillo, Sonora, México.

Abstract:

Jumbo squid (*Dosidicus gigas*) myofibrillar protein (JSM) stability/functionality remains after frozen storage due to its low molecular weight water-soluble compounds, such as arginine (Arg), taurine (Tau), sarcosine (Sar), and trimethylamine oxide (TMAO), among others. The objective was to evaluate the cryostabilizing effect of these compounds (individually or in mixtures) over JSM after frozen (-20°C) storage for 0, 1, 3, 30, and 90 days. Washed muscle (three times, 1:3, muscle:water) was lyophilized (sample). Washing water was ultrafiltrated (1 kDa) and permeate was lyophilized. Compounds [T1:Arg, T2:Tau, T3:TMAO, T4: Sar, T5:Arg+Tau, T6:Arg+TMAO, T7: Tau+TMAO, T8:Arg+Tau+TMAO, T9:Arg+Tau+TMAO+Sar, Con+ (<1 kDa fraction added)], added at muscle concentration to reconstituted sample, and control (washed-muscle only) were stored at -20°C. Cryoprotective effect on JSM was evaluated by differential scanning calorimetry, surface hydrophobicity (SoANS), solubility, and total-sulfhydryl (TS) content were conducted. Myosin thermal stability (T_{max}) increased ($P \leq 0.05$) in T3 (44.3 ± 0.3), T6 (44.2 ± 0.9), and T9 (44.5 ± 0.5) (TMAO in common) compared to Con (42.6 ± 0.3), before freezing (day 0). At 90 days of frozen storage, the same treatments, T7 and Con+ remained higher ($P \leq 0.05$) than Con. Since JSM preserves its functionality even after frozen storage, no apparent effect on SoANS was found. T2 (11.2 ± 0.0 - 12.8 ± 0.1) and T5 (10.6 ± 0.1 - 12.7 ± 0.0) (Taurine in common) solubility increased ($P \leq 0.05$) compared day 0 vs. 90 of frozen storage, respectively. TS in Con-, T2, T3, T5, T7, and T8 (Tau and/or TMAO in common), did not show any change ($P \leq 0.05$) compared day 0 vs. 90 of frozen storage. JSM cryostability is positively influenced by the presence of Taurine and/or TMAO.

Keywords: Squid muscle; cryoprotectants; cryostability; frozen storage.

*Presenter



PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

Ready About!

Title: Labeling Compliance, Species Authentication, and Short Weighting of Frozen Shrimp Sold in Grocery Stores in Southern California

Authors: McKenna Rivers*, Alexia Campbell, Chris Lee, Pragati Kapoor, Rosalee Hellberg

Chapman University, Schmid College of Science and Technology, Food Science Program
One University Drive, Orange, CA, 92866, USA

Abstract:

While shrimp is the most-consumed seafood product in the United States, there is a lack of research into the extent of short-weighting and mislabeling of shrimp in the marketplace. The objective of this study was to investigate frozen shrimp for Country of Origin Labeling (COOL) compliance, species authentication, acceptable market names, net weights, and percent glaze. A total of 106 frozen shrimp packages were purchased from grocery stores in Southern California. Samples were determined to be COOL compliant if both the procurement method and country of origin were reported at the point of sale. Species authentication and acceptable market names were determined by comparing the species identification based on DNA barcoding to the acceptable market names on the FDA Seafood List. Net weights and percent glaze were determined by weighing each sample before and after deglazing according to AOAC methods. Overall, 95% of samples were compliant with COOL; two samples did not indicate the production method and three had conflicting country of origin information. Short weighting was detected in 36% of samples based on the National Institute of Standards and Technology (NIST) standards of maximum allowable weight variation. The average percent glaze was 16.6%, with 27% of samples having >20% glaze. Species mislabeling was observed in 25% of samples, with conflicting market names and/or use of unacceptable market names. The results of this study indicate a high level of COOL compliance but suggest a need for increased scrutiny of species mislabeling and short weighting of frozen shrimp.

***Presenter and Student Competitor**



PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

Ready About!

Title: Detection and partial characterization of chemopreventive compounds from white shrimp (*Litopenaeus vannamei*) cephalothorax

Authors: Héctor-Enrique Trujillo-Ruiz^{a*}, Carmen-María López-Saiz^a, Alejandro-Monserrat García-Alegría^b, Idalia Osuna-Ruiz^c, Hisila del Carmen Santacruz-Ortega^d, María-Mercedes Meza-Montenegro^e, Juan-Francisco Maldonado-Escalante^e and Armando Burgos-Hernández^a

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- d. Departamento de Investigación en Polímeros y Materiales, Universidad de Sonora, Hermosillo, Sonora, C.P. 83000, México.
- e. Centro de investigación e Innovación en Biotecnología Agropecuaria y Ambiental, Instituto Tecnológico de Sonora, Cd. Obregón, Sonora, C.P, 85000, México

Abstract:

Mutations are the result of effects produced by mutagenic agents, which may be responsible for the generation of chronic-degenerative diseases such as cancer; therefore, the search for compounds capable of preventing mutagenesis is necessary. Several studies have reported the presence of bioactive compounds in seafood, but only few have been done in seafood by-products; therefore, the search for chemopreventive compounds by-products from marine organisms is the objective of this research. By-products from white shrimp (*Litopenaeus vannamei*) are alternative sources of bioactive compounds. In a previous study, the presence of antioxidant and antimutagenic activity in these by-products was demonstrated. The aim of the present study was to determine the capability of these compounds to provide protection to DNA. Using the comet assay for the determination of the protective effect and techniques such as nuclear magnetic resonance for the chemical-structural characterization. A fraction obtained from a methanolic extract provided DNA protection against the damage caused by H₂O₂. Partial chemical-characterization of this fraction suggested the presence of aromatic, hydroxylated, unsaturated type of compounds; however, further studies are needed for full characterization of that compounds.

***Presenter and Student Competitor**



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PACIFIC FISHERIES TECHNOLOGISTS CONSTITUTION

NAME OF ORGANIZATION

The name of the organization shall be "PACIFIC FISHERIES TECHNOLOGISTS".

PURPOSE OF ORGANIZATION

The purpose of the organization shall be to provide a medium of exchange of technical and scientific information among fisheries technologists, and those interested in fisheries technology, by holding meetings for the presentation of papers and discussions of technical scientific matters relating to the fisheries industries and to collaborate with research institutes, universities, and governmental agencies engaged in fisheries work.

MEMBERSHIP

Membership shall be open to anyone interested in fisheries technology. Emeritus members shall be: (1) currently retired, (2) active participants in past PFT meetings, (3) recommended by any PFT member, (4) designated by the Executive Committee, (5) identified in the membership database. All past Presidents, Secretaries, Treasurers and technical program chairs shall automatically become emeritus members upon retirement.

ATTENDANCE AT MEETING

There shall be two kinds of meetings: "Open" and "Members Only". Visitors shall be welcome to all "Open" meetings but shall be excluded from "Members Only" meetings. A quorum for the transaction of any business, including the election of officers, shall be two-thirds of the membership attending the meeting.

MEETINGS

The regular annual meeting will be held in a six-year rotation in the following order: (1) British Columbia, (2) Alaska, (3) Mexico, (4) California, (5) Oregon, and (6) Washington. The membership may decide to insert another location in this sequence on a one-time basis. Duration and time of meeting shall be left to the discretion of the Executive Committee. Special meetings may be held at any time or place at the discretion of the Executive Committee.

OFFICERS

The officers of the organization shall consist of a President, Secretary, Treasurer, Technical Program Chair and an Executive Committee of Regional Representatives who shall reside in British Columbia, Washington, Oregon, California, Alaska, Hawaii, and Mexico respectively. There shall be an At-Large Representative who may reside anywhere within the membership range of this organization. The President, Secretary, Treasurer, Technical Program Chair, Keeper of the Checkbook, past President, past Secretary, and past Treasurer shall be the 9th, 10th, 11th, 12th, 13th, 14th, and 15th members of the Executive Committee.



PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

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DUTIES OF THE OFFICERS

President - The President has the responsibility for establishing the time and place of the annual meeting, for arranging and presiding at all meetings, and for the content of all meetings.

1. **Secretary** - The Secretary is the chief assistant of the President. The Secretary is responsible for maintaining and distributing a current membership list, any correspondence needed with respect to PFT meetings and assist, as needed, in planning and arranging of annual meetings.
2. **Treasurer** - The Treasurer is responsible for collecting dues, maintaining the treasury, and for registration at the annual meeting. Other responsibilities include: payment of all bills in a timely manner, maintaining proper and up-to-date financial records, and transfer funds and final annual balance sheet to Keeper of the Checkbook. Also assist the President, as necessary, in planning and arranging of annual meeting.
3. **Keeper of the Checkbook** - The Keeper of the Checkbook has the responsibility of maintaining financial records, carrying out a yearly audit and arranging for advance transfers of funds to the local treasurer, as needed, for planning and execution of annual meeting. The office of Keeper of the Checkbook will provide stability for long term purposes and demands of the treasury.
4. **Area Representatives and Representative-At-Large** - The Representatives are responsible for assisting the President by arranging for speakers, maintaining liaison with members in their areas, and advising the President and Secretary of conflicting meetings.
5. **Executive Committee** - The Executive Committee is the governing body of the PFT and has the primary responsibility of recommending a slate of new officers for approval by the membership.
6. **Technical Program Chair** – The Technical Program Chair is responsible for soliciting presentations and scheduling the oral and poster presentations during the annual meeting.

NOMINATIONS

The outgoing Executive committee shall nominate the next President, Secretary, Treasurer, Technical Program Chair, Keeper of the Checkbook, and Regional Representatives. No one who has held the office of President, Secretary, or Treasurer may be nominated for any of these offices until the expiration of two years after they have held such office. Additional nominations may be made from the floor.

ELECTIONS

Elections shall be carried out at the annual Business Meeting and presided over by the Executive Committee. Voting shall be by a show of hands. The President will cast the deciding vote in case of a tie and announce the names of the elected officers.

DUES

Annual dues shall be ten (\$10.00) dollars per year. Annual dues will be waived for emeritus members who have retired from active work. The Executive Committee will decide registration charges for the annual meeting. Membership in good standing may be maintained by paying the annual dues. Members, except emeritus members who have not paid dues for two consecutive years will be removed from the mailing list.



PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

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AMENDMENT OF THE CONSTITUTION

Amendment of the constitution may be effected by a two-thirds vote of members at any annual meeting.

Amended February 14, 1978	Added California to rotation
Amended March 31, 1981	Increased dues to \$5.00/year
Amended February 28, 1984	Added Alaska to rotation
Amended May 29, 1987	Exempted emeritus members from paying annual dues and defined Emeritus members
Amended February 3, 1993	Added office of Treasurer, Permanent Treasurer, and increased dues to \$10.00/year.
Amended February 8, 1994	Added Mexico to rotation
Amended February 24, 1998	PFT members voted in favor of filing as a non-profit organization. The Permanent Treasurer position has been dissolved. There will be a Keeper of the Checkbook
Amended February 25, 2003	Changed list of meeting locations from five-years to six-years and put in order of current sequence
Amended February 25, 2003	Added description and requirements for emeritus members
Amended February 25, 2003	Added Keeper of the Checkbook to Executive Committee and included a description of duties
Amended February 25, 2003	Emeritus member information added under MEMBERSHIP
Amended February 20, 2007	Added Technical Program Chair to Executive Committee. Deleted term of Permanent Treasurer to correspond to 2/24/98.

Reviewed: October 4, 2013



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* STUDENT COMPETITOR



Networking Passport

Rules

1. Find people who fit the following descriptions and have a conversation with them.
2. After the conversation, have them write their name in the Passport space.
3. You cannot use the same person for more than one Passport space. You cannot sign your own name in any of the spaces.
4. All Passport spaces must be filled out.
5. Upon completion of all Passport spaces, turn in this page to Virginia Ng by 7:00 PM on Tuesday, February 28, 2023.
6. Pages will be entered into a raffle for a prize. Winner will be announced during the Tuesday night banquet dinner.

Your Name: _____

A PFT Platinum Sponsor	Screams During Scary Movies	Same Birth Month as You	From the Seafood Industry
Has Sang in Karaoke	A PFT Gold Sponsor	A Student from a Different State or Country as You	Has a Dog and/or Cat
From a Different Country as You	Took a Vacation in the Last Year	A PFT Silver Sponsor	Currently in Academia
Has a Poster Presentation on Monday at PFT	In the PFT 2023 Organizing Committee	Wearing the Same Color Shirt as You	Gave an Oral Presentation at PFT 2023

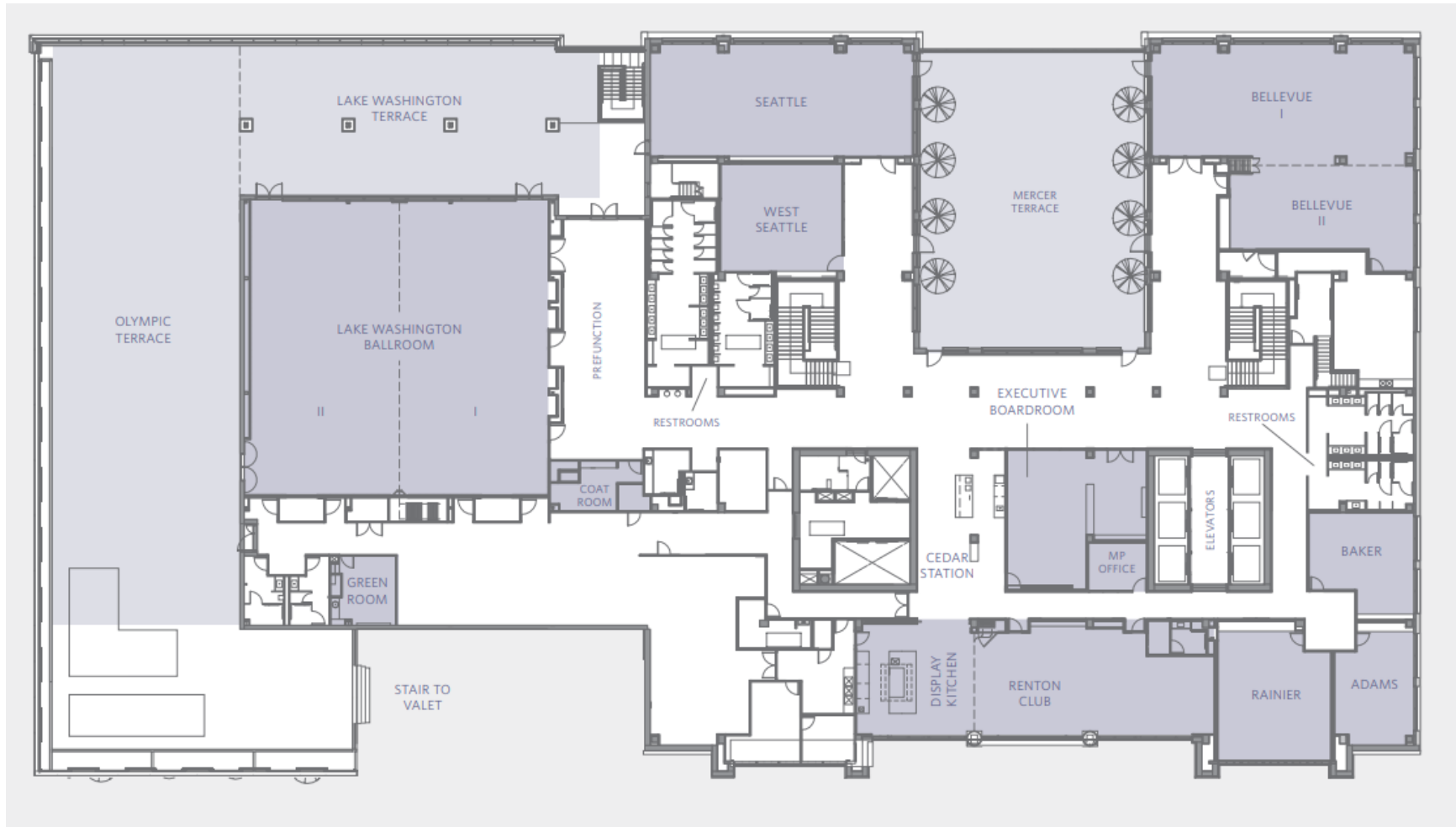


PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

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Hotel Map

Hyatt Regency Lake Washington
Floor Plan – Third Floor





PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE 2023

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List of PFT 2023 Attendees

As of February 12, 2023