



FOOD SCIENCE
AND NUTRITION

April 20, 2022

**PPIC Technical Committee meeting, Thursday, March 31st, 1:30 to 3:00 pm, Zoom meeting
AGENDA**

In attendance: Pam Ismail – UMN, PPIC Director
Karthik Pandalaneni –PPIC Manager of Operations
Gary Reinnecius – Professor Emeritus, UMN
Robert Bergia – ADM
Vanessa Brovelli – Bay State Milling
Diane Kussy- Bluegrass Ingredients
Kyungsoo Woo/ Clint Johnson – Conagra Brands
Mihir Sainani– Danone
Claire Boyle – General Mills
Adam Janczuk - IFF
Nagul Naguleswaran- Ingredion
Julie Anne Grover- Kraft Heinz
Ranveer Chandra /Anirudh Badam- Microsoft
Jennifer Kimmel – Roquette
Lolly Occhino – AURI

Regrets: Nathan Knutson – Cargill
Lehan Patrick – Saputo
Steve Hess - Hershey

1. Introductions and Welcome to Ranveer Chandra from Microsoft (new Partner), Mihir Sainani representing Jonathan Gray (replacing Yui) from Danone, and Robert Bergia (replacing Chelsey Hinnenkamp) from ADM (5 min), Kyungsoo Woo (replacing Clint Johnson) from Conagra
 - a. *Ranveer (Microsoft) – also represented by Anirudh*
 - *Looking to build capabilities by creating suitable technologies for the plant-protein industry*
 - *Worked on a project called “Farm Beets” to build data driven agriculture. Announced partnerships with Land O Lakes, Bayer and others as part of this project’s outcome.*
 - *PhD in Computer Science, Cornell*
 - *With Microsoft 17 years; CTO for agriculture and food, Managing Director for Research for Industries*

- b. *Anirudh (Microsoft)*
 - *Researcher with Microsoft for 10 years and part of Ranveer's team*
 - *Director of Research Engineers group*
- c. *Mihir Sainani (Danone) representing Jonathan*
 - *Senior Director for Research and Innovation*
 - *With Danone for 6 weeks, worked with Sargento Foods prior to Danone.*
 - *Background in cheese*
- d. *Robert Bergia (ADM)*
 - *9 months*
 - *Human clinical nutrition background*
- e. *Kyungsoo Woo (Conagra)*
 - *New to the team, started 6 months ago*
 - *Food Chemistry background*
 - *Optimize existing formulations and processes*
- f. *Claire Boyle (General Mills) representing Sarah on maternity leave*
 - *Was the first PPIC manager of operations!*
 - *Is on GMI protein technology team*
- g. *General Introductions*
 - *Gary (UMN) – Area of research-Flavor Chemistry, Dept of Food Science and Nutrition*
 - *Diane (Bluegrass)- Technical Sales Director- Background in dairy powders and seasoning blends*
 - *Vanessa (Bay State Milling)- R&D Director, BSM is provider flour miller, grain, seed, and pulse. Currently focusing on specialty grains and seeds for protein extraction*
 - *Lolly (AURI)- Senior Scientist, AURI provides resources and services to scale up and commercialize value added agriculture. AURI represent smaller companies and entrepreneurs in MN*
 - *Julie Anne (Kraft Heinz)- Ingredient Science team leader who focuses on plant proteins and flavor*
 - *Adam (IFF)- VP R&D, responsible for ingredient innovation*
 - *Jennifer (Roquette)- Protein Chemistry Manager. Roquette is provider of plant proteins, esp pea, texturized plant proteins, starches and polyols etc. from plants*
 - *Nagul (Ingredion)- Protein Chemistry Lead, responsible for development of plant-based ingredients*
 - *Clint (Conagra Brands)- Commercialization for frozen foods and look into incorporating plant-based proteins into portfolio as well.*

2. General Updates (35 min)

Objectives:

- a. Announcing new members: Microsoft (Partner), Bay State Milling (upgraded to Partner), Bayer (Associate Member-trial), Milk Specialties (Associate member-trial), Waters (Associate member-trial), Schreiber Foods (Associate member-trial), Amano (Associate member-trial), Caloris (Associate member-trial), Balchem (Associate member-trial), Ish

- Foods (Associate member), The Land Institute (Associate level). **Total of 36 members as of today!** (Total of 29 new members gained since quarantine in March 2020!)
- b. Four additional members signing agreements: Tate and Lyle at Partner level, Manitoba Harvest at one-year trial Associate level, Gehl Foods at one-year trial Associate level, and DryGro at Affiliate level. **This will bring us to 40 members this Spring!**
 - c. Two founding members renewals: ADM and Hershey
 - d. New supporters: Crown (Sponsor of the new level) and Extraction Alternatives (In Kind)
 - i. *Comments:*

Pam: Crown will fund start-ups to join the center. They will pay 50% membership fee.

Extraction Alternatives will provide in-kind support by defatting up to 50lb sample using solvent extraction, once a year.
 - e. New Level: Affiliate member (\$3,000 per year) with sponsorship program to cover 50% of the cost
 - i. *Comments:*

Pam: Affiliate membership is for low or no revenue company. They can also apply to sponsorship to pay 50% of \$3,000 membership fee. Their benefits include: visibility on website, access to events, host booth or table at PPIC events, receive advise and support, help with facilitating collaboration with PPIC members.
 - f. Update on external funding:
 - i. **Build Back Better Regional Challenge (BBBRC) call by Economic Development Administration (EDA):** one of seven sub projects lead by Greater MSP, Agriculture Innovation Scaling & Market Development (Ag project focused on sustainable plant protein) submitted in collaboration: PPIC, FGI, AURI and MBOLD. A total of \$3.4 million for UofM
 - 1. Comments:*

Pam: PPIC asked for \$3.4 million. Will be used mostly for analytical instruments and equipment (\$700K), then remaining for research project managers, and graduate students.
 - ii. Submitted grants to Good Foods Institute (GFI) (in collaboration with Bright Future Foods), to United States India Science and Technology Endowment Fund (USISTEF) -Energy Solutions Ignition Grants, and to North Harvest Bean Association
 - 1. Comments:*

Pam: GFI funding is for a research project that supports a start-up. North Harvest was looking for additional value and use of beans, kidney beans for example, where MN is number one producer globally.
 - g. Updates on currently funded PPIC projects: Cold Plasma Project ended, final report shared, two manuscripts, one published and one submitted. Hemp Project ended, final report will be shared, two manuscripts in preparation. Three projects funded in 2020 are under way with three progress reports so far submitted and shared. Additional two projects funded in 2021, and one is pending
 - i. Impact of Cold Plasma Treatment on Pea Protein Structural and Functional Characteristics
 - 1. Pam: Utilizing this project's outcome to submit USDA grant*

- ii. An Interdisciplinary Strategy for Improving Hemp Protein as a Food Ingredient through Plant Breeding and Processing
 - 1.Pam: Additional funding was secured from MN Dept of Ag to further investigate Hemp protein. Outcome of this project was used to submit this proposal, which was also ranked #1. Will start this project soon. PPIC project funds are being utilized as seed grants to apply for the bigger grants.*
- iii. Flavor Reactions with Plant Proteins (Given additional year of funding)
- iv. Enhancing Pennycress Oilseeds as a New Protein Source by Improving Flavor and Protein Extractability
 - 1.Pam: Few other projects funded by FGI were initiated to further investigate sustainable oilseeds such as Pennycress and Camelina as novel protein sources*
- v. Impact of Pea Storage Protein Fractions and Their Ratio on Functionality and Nutritional Quality
- vi. Plant Protein Blending: Inducing Molecular Interactions to Enhance Texturization
 - 1.Comments:*
 - Pam: other than membership dollars, PPIC is continuing to seek funding to do more basic research around the mission and objectives of PPIC and around the research priorities set by PPIC Partners.*
 - Anirudh: In addition to releasing these project reports, do you also make the tools you used in these experiments available?*
 - Pam: In the report you can see the tools and methods that are used to get the data. These projects also generate data that can be used to collaborate with Microsoft on prediction models.*
 - Anirudh: We use the data to reproduce experiments at scale*
 - Pam: All the project results are open access. As Partners you get the data as we produce it, before it goes to publication*
- h. Updates on Welcome Packages/Projects:
 - i. Completed (9) projects: Danone, Evergrain, Ingredion, Nutriati, Bay State Milling, Minn-Dak, Saputo, General Mills, Kraft Heinz
 - ii. In progress (4) projects: ADM, Benson Hill, CoverCress, PepsiCo
 - iii. Initiated (11): Motif, SunOpta, Milk Specialties, Applied Food Sciences, Microsoft, Bluegrass, Balchem, Ish Foods, Conagra, Nature's Fynd, Amano
 - iv. To be initiated (10): Cargill (Nathan Knutson), Hershey (Steven Hess), IFF (Adam Janczuk), Roquette (Jennifer Kimmel), Caloris, Meati Foods, Neom, Bayer, Waters, Schreiber Foods
 - 1.Comments:*
 - Pam: If you have not yet initiated your welcome package, please be in contact with us. You can use this project as a starting point for a larger research project.*
- i. Updates on individualized hands-on training: BSM, Kraft Heinz, Benson Hill
 - Pam: We encourage all of you to use this benefit as members. We can customize this hands-on training based on your company's and team's needs.*

j. New internships opportunity

1. Comments:

Pam: We have sent out internship application to many universities.

Internship will be for 4-6 months full time. We currently have 12 national and international applicants

k. Updates on PPIC events in 2021/2022:

i. Proteins Basics Short Course and Research Spotlight 3rd Annual Meeting (**Dec 6-8, 2021**)

1. Comments:

Pam: The events were all successful and we had 52 attendees for the short course and 118 attendees for the research spotlight event. Event page was updated with feedback we received.

ii. [Commercialization/Product Launch Workshop](#) (**June 9-10th 2022**)

1. Comments:

Pam: Registrations are open for this workshop. We have exciting topics and speakers confirmed. We also will have regulatory panel. As a member on the tech committee, you have one waived registration and as a PPIC partner you have 2 additional waived registrations for members on your team. Please take advantage of this benefit and register soon since it a limited availability event. Registration details are found in the event page of the PPIC website.

Nagul: What's the difference between the Research Spotlight and the Commercialization workshop?

Pam: The Research Spotlight features research presentations. The Protein Basic short course covers basic protein knowledge. Here for Commercialization Workshop, we are bringing speakers with industry experience to address topics including "development of plant protein-based products, technology scale-up, co-manufacturer selection, quality systems, intellectual property, regulatory, project management and marketing launch."

Nagul: Do you have all the speakers finalized?

Pam: We do have our speakers finalized, however if you have any suggestion or topic you'd like to address, please let us know.

iii. Industry Focused Research Planning Meeting (**TBD**)

1. Comments:

Pam: We held this last at the inaugural meeting in Nov 2018. We haven't been able to hold this since then because of the pandemic. This event is where we invite industry speakers to talk about their market trends, challenges, opportunities, and basic research needs. A good part of the meeting involves roundtable discussion and voting on research ideas/priorities that will be brought to the technical committee's table to select top 6 research priorities.

l. About you links: Featuring you on our website

1. Comments:

Pam: You were all sent a simple google form. We are updating our Members and Supporters page with a hyperlink for each member

company. You will each have your own simple webpage on our website with a link to your website and a simple blurb about your company, pictures, etc. This will give you more visibility on our website. I will send reminders to fill out this form if you have not done so already

m. PPIC experience google form

1. Comments:

Pam: Your feedback is very much appreciated. We will use your feedback comments on our website. Constructive feedback is also appreciated. I will resend the form to fill out if you have not done so already. Answers remain anonymous.

n. Developed [promotional video](#), worked with Lori and Dylan from CFANS

o. PPIC in the news (Food Business News, Lead Story on Driven for Greater MN, CFANS featured PPIC in their newsletter and website)

p. New hires: Three Researcher 2, one Researcher 4, two Postdocs.

q. Acquiring new instrumentation:

i. Two freeze dryers

ii. Floor centrifuge

iii. Contribution to new nitrogen analyzer

iv. HPLC unit

v. Contribution to bench scale Brabender twin-screw extruder- *Pam: Hopefully will get this in April. It has a capacity of as low as 200g and as high as 5kg per hour, has 2 gravimetric feeders, and cooling dye. So, we can do high moisture meat alternative trials using different starting materials. PPIC contributed to the purchase of this equipment, supplementing funds from the college, department, and other individual researchers.*

vi. Another Waters seed HPLC unit with kit for amino acids analysis.

vii. Additional accessories for another GC-MS-O unit

3. New RFP, hold until membership renewals, hopefully, release fourth RFP in fall 2022 (5 min)

a. Comments:

Pam: We usually send out an RFP every year. We are holding on our fourth RFP because most of our founding partners are close to renewal. I don't want to commit to new projects until we see our partners signing for renewal so we can secure additional funding for research.

Mihir: How do we know if we are up for renewal.

Pam: we will send out a reminder email to technical comm. member and other contacts in the company, so it wasn't missed.

4. Discuss other tasks (35 min)

Objectives: Discuss

a. When do we need to update research priorities (*Appendix 1*)– last updated March 2021

i. Comments:

Pam: Does tech comm. team members think that the current research priorities need to be updated? If yes, then we can discuss updates in a designated meeting.

Anirudh: How can Microsoft bring technology to the research efforts? What do you envision us doing with your data sets? What do you expect from our technology? One-click you get it all.

Adam: Most of these objectives are still very relevant. One area where digital platform could be considered: how do we aggregate these research findings? There is a lot of bits and pieces out there, it would be great if there is way to bring these pieces into a format to be translated into future research directions. Currently it's very scientific. It would be great if there is a way to put the information in the same "language". Digital platform might be able to standardize and aggregate research results.

Pam: Using a smart search that searches for interpretation as well is the goal of the PPIC's collaboration with Microsoft.

Mihir: These research priorities make sense from alternative protein standpoint. Is there a way to make a combination of all the information that comes out of the research?

Diane: The research priorities are valid still. There is lot of room to explore and open to interpretation

Nagul: Putting the data together would be helpful. What has been done and what hasn't worked.

Lolly: The priorities are relevant. There are several areas within these priorities that aren't addressed yet. Is there a way to attract some research in those areas?.

One area of interest to me would be nutrition. We had some research done on wild rice to measure PDCAAS, it was very difficult to compare the results.

Pam: Having focus areas within the research priorities is worth discussing, the nutrition value is impacted by processing methods and other factors, but what methods are being used for PDCAAS analysis is equally important.

Jennifer: Pam was looking to bring in more external researchers, did any of those brought in research ideas that we could use to expand this list?

Pam: We have expanded our researchers: Karolina from University of Lund, Kevin Murphy (Breeder from Washington State), Kaustav (University of Nebraska), Youling (University of Kentucky), Lutz (University of Mass.) Since addition of these researchers, we did not have an RFP out but when we have an RFP, it goes out to all our researchers.

We can send out a google form to ask the cohort about the research they are doing to see where it fits in our research priority. We might come across some research areas that we can expand on from that information. We can bring that to future meetings for discussion.

Robert: These are relevant. A spin off from item # 3. Investigate cleaner plant protein processing techniques that have less environmental impact, while preserving or improving functionality, flavor, and nutritional quality.

Popular term in nutrition science community now is the "Dark matter" of nutrition. There are 150 food components and nutrients that are routinely characterized in our best food databases. But there are about 26,000 bioactive compounds in food that are largely unexplored. If there is interest in expanding characterization of these dark matter of nutrition, it would benefit our industry.

Pam: We can definitely engage some of our nutrition faculty more and explore more into the nutrition area.

Kyung: Just like how PPIC is standardizing methods to evaluate functional property of plant proteins, similar work can be done on nutrition and flavor. For product developer, we want to have a quick tool where we can access the data from PPIC database. Data can be grouped based on the functional properties of the plant proteins, so community can benefit from this information.

Pam: A lot of our research isn't open access unfortunately. But the more research dollars we have the more public access data we can generate to build something like that.

Vanessa: Building a data base would be great. Varietal research and its impact on protein extraction, yield, nutrition, flavor etc. Not all chickpeas are equal, not all pre-processing that is done on raw material is equal.

Pam: We do see the need for this kind of research, and it is good to add this to our basic research ideas.

Claire: The priorities still are relevant, especially flavor. A data base would be helpful

Julie Anne: I am still aligned with the previous priorities and open to new suggestions.

Pam: We will send out google forms to researchers to see what other research ideas we can add to our priorities. We will also put all the ideas you gave and set up another meeting to discuss them. We will send an excel similar to last year's, where you can put down the research areas you like to explore.

- b. When to hold next PPIC events, what to prioritize (short course, research spotlight, or industry focused research planning meeting)

- i. Comments:

Pam: Would you like our next meeting to be the Industry-Focused Research planning meeting where we could ask many of you to present, and host our research spotlight and short course to spring 2023.

Adam: Sometimes if you do things too frequently, there are fewer updates. There is a lot of other conferences and meetings who invite industry speakers. What is PPIC doing that is different and special? Those December events were unique to PPIC.

Pam: During Industry-Focused Research Planning meeting, I have specific topics I like to have covered by industry speakers. The presentations will allow us to pool research priorities and discuss them and rank during round table discussion. The ranked research priorities will be further discussed by the technical committee to choose and refine the Center's top priorities.

- c. How to facilitate interactions among current members to initiate collaborative projects
 - i. Informal pitch session for industry members to find common research interests among member companies
 - ii. Pam discusses with companies 1:1 under NDA and then find common interests to unite companies

- i. Comments:

Pam: If you have any thoughts, you can email those to us. And I can bring it up with you all in our next meeting. We will send a google form to collect your responses.

- d. Diversify the industry members, current members promoting PPIC (**Tabled**)
- e. Discuss new ideas that **Partners** would like the PPIC to implement

i. *Comments:*

Pam: What else can we do as benefits for Partner members. We will add this to the google form as well.

5. Next steps (5 min)

Objectives:

- a. Advertise commercialization workshop!
- b. Send out final/quarterly reports
- c. Plan next PPIC event
- d. Initiate more welcome package projects
- e. Continue recruiting efforts
- f. Determine focus of next meeting; when should we meet next?

Action Points:

- 1. Hemp final report and Quarterly reports of RFP 2 & 3 projects will be sent along with minutes.
- 2. Pam will review the suggestions on revising research priorities
- 3. PPIC team will send google form to PPIC researchers to get new research areas they are working on and determine how they fit within our research priorities.
- 4. Plan next technical committee meeting to discuss research priorities and other tabled items from this agenda.
- 5. Google form will be sent to PPIC members to get ideas on how to initiate collaborations and on additional benefits they would like to see us add.