COLLABORATIVELY GROWING THE LANDSCAPE OF PLANT-BASED PROTEINS

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https://ppic.cfans.umn.edu
Plant Protein Innovation Center

Mission

The Plant Protein Innovation Center (PPIC), first in the nation, mission is to bring together interdisciplinary researchers and industry partners to deliver to the supply chain new nutritious and functional plant protein ingredients and products, working all the way from breeding and genetics to processing, formulation, and marketing.

Approach

The PPIC will address industry-identified plant-protein challenges and opportunities to develop a wealth of fundamental science leading to a low emission food industry.
The PPIC will not only bring economic gain to the industry, but will also address the consumer desire for nutritious and healthy food, have a positive impact on the environment by seeking and utilizing sustainable crops, provide additional sources of protein for the growing population, and provide revenue to farmers.
How? The PPIC Model

- Research will be mainly **Pre-Competitive** and **Non-Proprietary**
- Will focus on fundamental science that addresses industry needs and consumers demands

**Total funds acquired:** over $4,000,000

- Industry Contributions/Memberships
- Sponsored Research
- Non-Proprietary Research
- State/Federal Funding
- Private Investors
- Foundations
The PPIC Model:
Coming Together to Grow Research
Research Areas

- Breeding & Genetics
- Agronomy
- Analytical Chemistry
- Food Science & Technology
- Nutrition
- Informatics
- Bioengineering
- Biomaterial Science
- Chemical Engineering
- Biochemistry
- Business Management
- Agricultural Economics
- Statistics
- University of Minnesota
  Driven to Discover™
Research Areas

- Food Science & Technology
- Nutritional Informatics
- Bioengineering
- Agricultural Economics
- Chemical Engineering
- Biochemistry
- Business Management
- Statistics

Experts in Various Fields

- Protein Functionalization
- Protein Bioactivity
- Proteomics
- Protein Chemistry
- Metabolomics
- Human Nutrition
- Animal Nutrition
- Polymer Characterization
- Encapsulation
- Toxicology
- Product Development
- Protein Extraction & Concentration

Broad Instrumentation & Research Capabilities

- Protomomics and Mass Spectrometry Center
- Polymer Characterization Facility
- NMR Center
- Analytical Biochemistry Center
- Rheology Characterization Lab
- Food Processing Center (Pilot Plant)
- Encapsulation Center
- Sensory Center
- Biotechnology Institute
- Equipped Research Labs

- Agronomy
- Breeding & Genetics
- Analytical Chemistry
- Agronomy
- Analytical Chemistry
- Agricultural Economics
Areas to be Addressed

- Understand how novel proteins can replace or be combined with traditional protein ingredients in various food products to deliver optimal nutrition, functionality, and flavor.

- Determine viable (cost effective) extraction (wet and dry) and processing technologies for producing functional protein ingredient from novel sources.

- Develop prediction models to link protein structure to function.

- Unveil unique characteristics and applications for each protein source.

- Investigate crop diversity and breed for protein quality traits.

- Secure abundant and sustainable supply.
Identified Research Priorities

**Production**

*Primary research focus areas related to breeding, sustainability of the supply, and crop diversity*

**Processing & Formulation**

*Primary research focus areas related to extraction methods, unique processing, co-products, food systems, high value end use*

**Application**

*Primary research focus areas related to flavor, functionality, and nutrition*

https://ppic.cfans.umn.edu/research/research-priorities
Research Advances

PPIC Funded Research
- Three successful RFPs resulting in five one-year projects, submitted by PPIC researchers, funded for up to $50,000 per year
- Link to research summaries

PPIC Grant Proposals (Over one million dollars)
- Proposal funded through Good Food Institute (GFI) (2020)
  - Title: Characterizing and texturizing proteins from pulses to form fibers with textures that mimic chicken
  - Three interdisciplinary PPIC researchers
  - Funds granted: $250,000
- Proposal funded through Foundation for Food & Agricultural Research (FFAR) (2020)
  - Plant Protein Enhancement Project
  - Title: Legumes of the future: Developing methodologies and germplasm to enhance the functionality and nutritional quality of pea protein
  - Five interdisciplinary researchers
  - Funds requested: $800,000
Who?

Industry Members

Partners

Kellogg's
Kraft Heinz
Microsoft
Roquette
Saputo

Associate Members

AFS
Amano
Benson Hill
Caloris
Johnsonville
Meati
The Land Institute
MSG
Minn-Dak Growers, Ltd.
Motif
Nutriati
PepsiCo
Scoular
SunOpta
Who?

Supporters & Collaborators

Agricultural Utilization Research Institute
BRIDGE2FOOD
Canada Consulate General Consulat général
DIL
Forever Green
Plant Based Foods Association
Schwan’s Company
University of Manitoba
Wageningen University & Research
The Good Food Institute
Improving
Who?

• Researchers
  – 25 interdisciplinary researchers across the University of Minnesota and from external institutions!
    https://ppic.cfans.umn.edu/expertise/researchers

• Students and post-docs!
Become a Member of the PPIC!

*With investment and collaborative effort between industry and researchers, we can innovate*

- **Affiliate**
  - Companies with an annual revenue of less than $2 million
  - A yearly membership fee of $3,000

- **Associate**
  - Companies with an annual revenue between $2 and $5 million* and for organizations wishing to join the center
  - A yearly membership fee of $6,000/year for 3 years

- **Partner**
  - A yearly membership of $20,000 for 3 years for companies that have $5-100 million annual revenue;
  - A yearly membership of $40,000 for 3 years for companies with more than $100 million in annual revenue

*A company that makes more than $5 million annual revenue may join at an associate level for a one-year trial period, non-renewable. If they wish to remain a member of the PPIC they must join at the partner level the following year and will have to sign a new agreement.*

[https://ppic.cfans.umn.edu/model-involvement](https://ppic.cfans.umn.edu/model-involvement)
Benefits to Members

When you join the Plant Protein Innovation Center, you get many benefits:

As an Affiliate member, PPIC offers:
- Visibility on our website and networking opportunities
- Two waived registrations to three annual events (~$2,000 value/per event)
- Opportunity to host booths at fall research spotlight and spring planning meetings at no additional cost
- Expert advice and support for troubleshooting processing/product development challenges
- Facilitated collaboration with other PPIC member companies

As an Associate member, you benefit additionally from:
- A Welcome package of $8,000 value offers a complimentary project custom designed to meet your research needs
- Customized hands-on training on various analytical techniques
- Support with setting up new R&D labs for protein research

As a Partner member, you benefit additionally from:
- Having an R&D scientist on the Technical Committee
- Contribution to and development of the center Research Priorities
- Receiving quarterly updates on PPIC Funded projects
- Involvement in decision making to fund research proposals

https://ppic.cfans.umn.edu/model-involvement/membership-options
PPIC Outreach

Annual PPIC events include:

- Industry Focused- Research Planning meeting
- Research Spotlight Meeting
- Protein short courses and hands on experiences
- Workshops on
  - Scale up challenges
  - Abundance of supply challenges
  - Innovative product development and product launches

Outreach will allow for the exchange of knowledge between the public and private sphere

What PPIC Offers the Community

- Networking opportunities during events with companies across the value chain (Ingredient suppliers, processors, and CPG companies)
- Interaction with scientists from various disciplines
- Research advancement and innovation
- Development of new and successful protein ingredients and applications
- Post-farm processing technologies that add value along the entire value chain
- Scaling plant protein from regenerative Agriculture
- Development of environmentally sustainable protein crops
- Securing supply chain
- Training the next generation of plant protein scientists

Thank You to Our: Technical Committee

Chelsey Hinnenkamp  
Protein Research Scientist, Archer Daniels Midland Company

Vanessa Brovelli  
Sr. Manager, R&D, Bay State Milling

Diane Kussy  
Technical Sales Director, Bluegrass Ingredients

Nathan Knutson  
Nutrition Center of Expertise & PPD Leader for the Americas, Cargill

Clint Johnson  
Director, R&D Conagra Brands

To be filled soon  
Danone North America

Sara Rosene  
Associate Principal Scientist, Nutrition & Technology Solutions, Protein Program, General Mills

Steven Hess  
Senior Director, Snacks Research & Development, The Hershey Company

Nagul Naguleswaran  
Protein Chemistry Lead, Global Research & Innovation, Ingredion Incorporated

Adam Janczuk  
Global Director, Re-Imagine Protein® International Flavors & Fragrances

Gabriela Perez-Hernandez  
Senior Manager, R&D External Partnerships, Kellogg Company

Julie Anne Grover  
Principal Scientist, Technology Discovery & Development, Kraft Heinz

Ranveer Chandra  
CTO Agri-Food, and Managing Director, Research for Industry

Jennifer Kimmel  
Senior Protein Chemist, Roquette America, Inc.

Lehan Patrick  
Director, R&D Saputo Dairy Foods USA

Lolly Occhino  
Scientist of Food & Nutrition, Agricultural Utilization Food Science & Nutrition Dept, Research Institute

Gary Reineccius  
Professor Emeritus, University of Minnesota
Thank You to Our: Executive Board

Laurice Pouvreau  
Senior Scientist & Project Leader,  
Plant Protein Technology  
Wageningen University & Research (The Netherlands)

Denis Chéreau  
CEO,  
IMPROVE (France)

Greg Cuomo  
Associate Dean for Research & Graduate Programs,  
CFANS, University of Minnesota

Sergiy Smetana  
Head of Food Data Group,  
German Institute of Food Technologies (DIL e.V.) (Germany)

Julie Simonson  
Food & Beverage R&D Executive Professional,  
Schwan’s Company

Jason Robinson  
R&D Leader,  
Agricultural Utilization Research Institute

Christina Connelly  
Trade Commissioner,  
Consulate General of Canada
The PPIC will not only bring economic gain to the industry, but will also address the consumer desire for nutritious and healthy food, have a positive impact on the environment by seeking and utilizing sustainable crops, provide additional sources of protein for the growing population, and provide revenue to farmers.
Partner with us today to change the landscape of plant-based protein tomorrow!

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