

# Adeline BOIRE

Research Scientist at INRAE

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## Research interest

I am investigating the structure and dynamics of **plant proteins assembly** in relation to their function in real systems such as **food matrices** and **plant seeds**. I am interested in the **interdisciplinary approach** that require such investigations at the interface of biology, chemistry and physics.

*Key words: plant proteins, assembly, interaction, hydration, intrinsic disorder, biophysics.*

## Education

2010–2014 **PhD**, *Université Montpellier 2*, Montpellier, France  
Physical chemistry of protein assembly

2006–2010 **Engineering degree**, *Montpellier SupAgro*, Montpellier, France  
Agricultural Science, Major in Food Science

## Skills & Technics

- Protein purification & biochemistry
- Scattering technics (DLS, TR-SLS, SAXS) & physical chemistry (zeta potential, phase diagram)
- Milli/microfluidics for screening protein interactions & assembly
- Microscopy (light, confocal)
- Spectroscopy (UV-Vis, FTIR, SR-CD, fluorescence)
- Computing (R, R-Shiny, Python)

## Experience

- 2015–to present **Research Scientist**, *Unité BIA*, Nantes, France  
Physical approach to structure plant proteins: link between interaction, structure & dynamics.
- 2014–2015 **Post-doctorate**, *AMOLF, Biological Soft Matter Group*, Amsterdam, Netherlands  
Mechanical and dynamical properties of composite fibrillar networks made of cytoskeletal proteins.
- 2010–2014 **PhD Student**, *UMR IATE*, Montpellier, France  
Structuring mechanisms of wheat proteins in soft condensed systems

## Fundings & Projects

- 2023–2029 **Let's ProSeed**, *ANR, Partner*, 3 M€  
Pushing back the limit to the use of legume proteins in human nutrition by improving seed quality and processing without compromising stress resistance.
- 2023–2028 **JACK**, *ANR, Partner*, 1.8 M€  
Just Adopt pulses from Cook to fork.
- 2022–2023 **FoodProteinsDB**, *INRAE-Transform, Principal Investigator*, 40 k€  
A biochemical, physical-chemical and nutritional database of dietary proteins.
- 2019–2021 **PROVIDE**, *INRA-CNRS Grant, Principal Investigator*, 60 k€  
Dehydration and plant proteins solubility - towards better functional properties.
- 2020 **Equipment acquisition (nitrogen analyser)**, *Regional co-fund, Principal Investigator*, 25 k€
- 2018–2021 **Minimal Protein Bodies**, *INRA-Regional PhD Grant, Principal Investigator*, 96 k€
- 2016–2020 **Plant Proteins Physics**, *Regional Starting Grant, Principal Investigator*, 100 k€  
Plant storage proteins: a physical approach to control their phase behavior and their self-assembly.

- 2016–2020 **GreenProtein**, *BBI EU project, Partner*, 4.5 M€  
Revalorisation of vegetable processing industry remnants into high-value functional proteins.
- 2017–2019 **PartMol**, *INRA-CEPIA Department, Partner*, 40 k€  
Pea protein microgels as models to study the effect of food structure on protein digestibility.
- 2016–2018 **MicroPro**, *INRA-CEPIA Department, Principal Investigator*, 30 k€  
Droplets-based millifluidic for controlling plant proteins assembly.
- 2015–to present **Synchrotron SOLEIL**, *5 successful proposals (9 shifts on SWING for SAXS, 32 shifts on DISCO for SR-CD and autofluorescence microscopy)*

## Mentoring & Teaching experience

### Mentoring activities

- 2023–2026 **Jolijn Koomen**, *PhD Student*, Co-advisors: Dr C. Berton-Carabin, A. Meynier, Dr A. Boire  
Functionalities of pea and faba bean protein ingredients: Are lipids key players?
- 2022–2025 **Asna Vakieri**, *PhD Student*, Co-advisors: Dr A. Boire, Dr D. Renard, Dr S. Bouhallab  
Competition between aggregation and coacervation in protein-protein, polyelectrolyte-polyelectrolyte systems.
- 2021–2024 **Adilson R. L. Pereira**, *PhD Student*, Co-advisors: Pr Nicoletti, Dr A. Boire, Dr C. Berton-Carabin  
Resilient, sustainable and nutritious: pigeon pea protein fractions as high-potential food ingredients.
- 2018–2021 **Rémy Cochereau**, *PhD Student*, Co-advisors: Dr A. Boire, Dr D. Renard  
Role of hydration and confinement in wheat protein assembly through the development of synthetic protein bodies.
- 2017–2020 **Maude Ducrocq**, *PhD Student*, Co-advisors: Dr A. Boire, Pr V. Micard, Dr M.-H. Morel, Dr M. Anton  
Rubisco-enriched wheat based products - from protein interactions to associated digestibility.
- 2017–2020 **Line Sahli**, *PhD Student*, Co-advisors: Dr A. Boire, Dr D. Renard  
Deciphering the role of intrinsic disorder in plant protein phase behavior using model polypeptides.
- 2015–2017 **Chloé Amine**, *PhD Student*, Advisor: Dr D. Renard, Scientific support: Dr A. Boire  
Droplets-based millifluidic for the screening of biopolymers interactions.
- 2017, 6 months **William Ainis**, *Hosted PhD Student*, Synergy between rapeseed and milk proteins
- 2017, 2 months **Jade Pasquier**, *Hosted PhD Student*, Purification of rapeseed proteins
- 2011–to present **Mentored 6 BSc & 6 MSc Students**

### Teaching experience

- 2010–2013 **Teaching assistant in Food physical-chemistry**, *BSc level*, 192 hrs/yr

### Outreach activities

- 2018–2019 **Chiche**, *Les Inventuriers*, Nantes Metropole, Elementary School George Sand, Coordinator: V. Rampon
- 2017–2018 **Towards new food applications for pulses**, *Passeport recherche*, Highschool, Bouguenais
- 2016–2017 **A lentil-based chocolate mousse: nightmare or reality**, *Passeport recherche*, Highschool, Angers
- 2017 **Healthy eating to grow up well**, *Fête de la Science 2017, Forum Sequoia 2017*, In collaboration with UMR PHAN, RFI Food For Tomorrow
- 2010–2012 **Food & Culture On Your Plate**, *Les cordées de la réussite*, in collaboration with Pr. V. Micard and Collège Las Caze, Montpellier

## Selected publications

- 2024 Locali Pereira, A., *et al.*, **2024**, *Food Hydrocolloids*, 109923  
Cochereau *et al.*, **2024**, *Pre-print SSRN*, <http://dx.doi.org/10.2139/ssrn.4711584>  
Cochereau *et al.*, **2024**, *Pre-print Protocol Exchange*, 100323, <https://doi.org/10.21203/rs.3.pex-2547/v1>  
Gallo *et al.*, **2024**, *Future Foods*, 100323
- 2023 Locali Pereira, A., Boire, A. *et al.*, **2023**, *ACS Food Science & Technology*, 3, 1777
- 2022 Ducrocq, M., Morel, M.-H. *et al.*, **2022**, *Food Chemistry*, 381, 132254
- 2021 Hinderink, E., Boire, A. *et al.*, **2021**, *COCIS*, 56, 101507  
Sole-Jamault, V., Davy, J., Cochereau, R. *et al.*, **2021**, *J Cereal Sci*, 103, 103386  
Hinderink, E., Berton-Carabin, C. *et al.*, **2021**, *JAFC*, 69, 23, 6601–6612
- 2020 Sahli, L., Boire, A., Solé-Jamault, V. *et al.*, **2020**, *Int J Biol Macromol*, 165, 654–664  
Cochereau, R., Renard, D., Nous, C., Boire, A.\*, **2020**, *J Coll Int Sci*, 580, 709  
Ducrocq, M., Boire, A.\*, Anton, M., Micard, V. *et al.*, **2020**, *Food Hydrocoll*, 109, 106101

- Amine, C., Boire, A.\*, Davy, J., Reguerre, A.-L. *et al.*, **2020**, *Food Biophysics*
- 2019 Sahli, L., Solé-Jamault, V., Renard, D., Boire, A., **2019**, *Sci Rep*, 9, 13391
- Ainis, WN., Boire, A.\*, Solé-Jamault, V., Nicolas, A., *et al.*, **2019**, *Langmuir*, 35, 30, 9923-9933
- Boire, A.\*, Renard, D., Bouchoux, A. *et al.*, **2019**, *Ann Rev Food Sci Tech*, 10, 14.1
- Amine, C., Boire, A., Kermarrec, A., Renard, D., **2019**, *Food Hydrocoll*, 92, 94
- 2018 Boire, A.\*, Sanchez, C., Morel, M.-H., *et al.*, **2018**, *Sci Rep*, 8, 14441
- 2017 Amine, C., Boire, A., Davy, J., Marquis, M., Renard, D., **2017**, *Food Hydrocoll*, 70, 134
- Boire, A., Menut, P., Morel, M.-H. and Sanchez C., **2015**, *J Phys Chem B*, 119, 5412
- 2013 Boire, A., Menut, P., Morel, M.-H. and Sanchez C., **2013**, *Soft Matter*, 9, 11417

## Selected oral communications

### Oral

- 2023 **International Congress on Engineering and Food**, Nante, France  
Locali Pereira A.\* *et al.* Physical pre-treatments of pigeon pea seeds: impact on the conformation and functionality of proteins extracted by aqueous fractionation.
- 2021 **European Colloid and Interface Society**, Athens, Greece  
Cochereau R.\*, Boire A., Renard D. Porous biomimetic vesicles as microreactors to modulate the phase behaviour of macromolecules.
- 2020 **Biophysical Society Conference**, San Diego, USA  
Sahli L.\*, Solé-Jamault V., Renard D., Boire A. Liquid-liquid phase separation of wheat gliadins: towards physiological conditions.
- 2019 **Edible Soft Matter, SoftComp Workshop**, Le Mans, France (*Invited Keynote Speaker*)  
Boire A.\*, Sahli L., Anis WN, *et al.*. Role of charge anisotropy in the assembly of oppositely charged proteins.
- 2018 **Biophysical Society Conference**, San Francisco, USA  
Boire A.\*, Sanchez C. *et al.* Unravelling the contrasting phase behavior of wheat gliadins.
- 2017 **Biopolymers**, Nantes, France  
Sahli L., Solé-Jamault V., Renard D., Boire A.\* Intrinsic disorder in plant storage proteins.  
Amine C., Davy J., Marquis M., Boire A., Renard D.\* Droplets-based Millifluidic & biopolymers phase diagram.
- 2016 **European Colloid and Interface Society**, Rome, Italy  
Boire A., Sanchez C., Morel M.-H., Lettinga M.P., Menut P. Unravelling the contrasting phase behavior of wheat gliadins: how to store storage proteins.  
**Soft Matter Conference**, Grenoble, France  
Amine C.\*, Davy J., Marquis M., Boire A., Renard D. Droplets-based Millifluidic & biopolymers phase diagram.