

## 2.2.

## 2.2. Collaboration is in our DNA

**Groningers like working together on sharing knowledge, tackling challenges and creating added value. This is why the ‘triple helix’ model of collaboration between companies, local government and knowledge institutes is commonplace at Campus Groningen. The current valorisation environment is a result of joining forces. Campus Groningen has amassed plenty of experience with setting up partnerships, both in the public and private sectors. This ensures new innovations within the knowledge fields of Food & Feed, Biobased materials, Biobased chemicals and Biobased energy.**

### Chemport Europe

Chemport Europe bundles sustainable chemistry in the Northern Netherlands. By linking agriculture, technology, science, small and medium-sized businesses and industry, room is created for new innovations. It also creates a dynamic ecosystem for companies that work on a greener chemical sector. Knowledge, networks and facilities are shared within Chemport Europe. This simplifies matters, from building a new factory, obtaining raw materials and energy, to developing new biobased products. It is Chemport Europe's ambition to accelerate the green economy and to put the Northern biobased chemical sector on the global map.

### BIO Cooperative

The BIO Cooperative is the partnership of Northern Netherlands small and medium-sized businesses active in the biobased economy. The Cooperation focuses on knowledge sharing and the realisation of cost reduction and turnover increase for its members. Market-led projects are implemented in various domains within the BIO Cooperative, such as Biobased processing and Biobased chemicals. The cooperation supports its members in the areas of financing, laws and regulations, lobbying, marketing and branding, and enables members to do what they do best: be entrepreneurial. At the start of 2016, the BIO Cooperative already consisted of 15 members. It is expected that by 2020 this will have grown to up to approximately 40 members with more than 750 FTE in total.

### Bio Economy Region Northern Netherlands (BERNN)

BERNN is a partnership between the four northern Universities of Applied Sciences and the University of Groningen, with the aim of further expanding the leading role the Northern Netherlands plays within the biobased economy. The region's ability to convert knowledge into industrial application is crucial. Demand-oriented and application-focused collaboration between the northern knowledge institutes is essential as well. BERNN focuses on linking knowledge and crossovers between fundamental and applied sciences, cooperation with the (inter)national business community, aligning with national and European ambitions, raising the profile of the northern region as Bio Economy Region, and lobbying with central governments.

### The Carbohydrate Competence Center (CCC)

The CCC in Groningen is the ultimate carbohydrate knowledge centre in the Netherlands. Here excellent knowledge on carbohydrate research converges. The CCC is a partnership between University of Groningen, Wageningen University & Research Centre, other knowledge centres and a large array of companies. The CCC mainly focusses on the synthesis, modification and/or breakdown of carbohydrates within two key areas, 1) Carbohydrates for food and health; and 2) Carbohydrate conversion and processing, with a focus on carbohydrate extraction from biomass and the conversion into biobased chemicals, biobased materials and biobased fuels.

### The Protein Competence Centre

The Protein Competence Centre (PCC) carries out innovative protein research at the frontiers of knowledge, for the purpose of a healthy and sustainable society. This happens in collaboration with Food & Feed companies and knowledge partners such as Avebe, Darling Ingredients, DSM, Duynie, FrieslandCampina, Nutricia Research, VanDrie Group, Hanze University of Applied Sciences Groningen, NIZO Food Research, University of Groningen, TNO, University Medical Center Groningen and Wageningen University & Research Centre.

### The Groningen Engineering Center

The Groningen Engineering Center (GEC) unites teams of engineering researchers at the University of Groningen working on engineering science for the development of industrial processes. In the area of the biobased economy GEC researchers provide unique expertise in both fermentative/enzymatic as well as chemo catalytic conversions. Examples are the design and optimization of biotechnological processes and conversion of aquatic biomass for novel carbohydrates and polymers. Chemo-catalytic biomass conversions for biofuels, biobased chemicals, and biobased materials are also actively pursued. Examples are second generation biofuels based on pyrolysis technology and biobased monomers for bioplastic synthesis. Research activities are aimed to reduce the manufacturing costs of these processes and hereby aid the transition from our fossil based economy to a more sustainable biobased economy.



# Carbohydrate capital of the Netherlands

Food & Feed, Biobased Chemicals

Lubbert Dijkhuizen, University of Groningen

**Groningen is the carbohydrate capital of the Netherlands. A result of the large amount of potatoes and sugar beets, and the considerable dairy livestock. It also has to do with the large industry that surrounds these resources and with the many breakthroughs by the Carbohydrate Competence Centre (CCC).**

Health is a major theme for the CCC researchers. For instance, they adapted carbohydrates in such a way that they are no longer broken down in the mouth, but only once they get to the gut. The result? The potato eater ingests fewer calories. Adapting sugar is also a hot item. By utilising specific enzymes, the sugar polymers change shape. This leads to a full feeling after eating. In other words, a biological gastric band based on adapted carbohydrates.

Within the last ten years, the CCC has carried out 30 million euros worth of research in partnerships with companies such as FrieslandCampina, Danone, Royal Cosun, Agrifirm, Aviko and Avebe. The researchers decipher carbohydrates, search for new properties and adapt them in such a way that they behave differently. This results in better food, for example. And by extension, in better health. By working together like this, companies and scientists extract even more value from the abundant carbohydrate-rich biomass.