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# Teaching and Research Remits

Plant Sciences Group

Part of the Wageningen University Chair Plan 2019-2022

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Wageningen University & Research  
Wageningen, July 2021

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This is an annex to the Chair Plan of 2019-2022 of Wageningen University & Research with the teaching and research remits of all ninety-four regular chairs of Wageningen University standardized and collected between 2020 and 2021.

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# 1 Introduction

In the teaching and research remit the chair's specific domain is described within the framework of the mission and objectives of Wageningen University & Research (WUR). With this specific scientific domain the chair holder leads and directs the chair group. According to Article 18 of the WU Administrative and Management regulations for each regular chair teaching<sup>1</sup> and research remits should be formulated and centrally documented in the Chair Plan.<sup>2</sup>

This document is a collection of the standardized teaching and research remits of all ninety-four regular chairs and forms an annex to the Chair Plan of 2019-2022.

The teaching and research have been categorized by department and displayed in alphabetical order lead by their acronym. The teaching and research remits contain the name of the chair holder; the acronym, the English and when applicable the Dutch name of the chair; a summary of the remit; a description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair; and a description of the remit regarding teaching, research and value creation.

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<sup>1</sup> Regular chairs are chairs with a chair holder. Personal, special and endowed chairs are embedded in a regular chair.

<sup>2</sup> WU Administrative and Management regulations Article 18

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## 2 Plant Sciences Group

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## 2.1 Teaching and research remit Bioinformatics (BIF)

**Chair holder: Prof. Dick de Ridder**

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1	<i>Name of the chair group (in English and Dutch)</i>	Bioinformatics (BIF) / Bioinformatica
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	The Bioinformatics chair develops new computational methods to analyse omics data and uses these to address biological questions. The chair also educates life scientists and bioinformaticians in the use and development of bioinformatics methodology.
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	Progress in life science increasingly depends on the correct analysis, integration and interpretation of ever-larger data volumes. Bioinformatics expertise is essential to perform state-of-the-art research and educate life scientists and bioinformaticians at Wageningen University.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	The Bioinformatics chair develops novel computational methods for the representation, analysis and integration of biological data, specifically omics data, to understand how the interplay of genomes, transcripts, proteins and metabolites results in the phenotypic complexity observed in living systems. The chair performs interdisciplinary research at the forefront of bioinformatics, both independently as well as in collaboration with partners in academia and industry, to address a wide range of biological questions. The chair also contributes to biological research in general, by disseminating useful methods and databases, and aims to be the bioinformatics centre of expertise within Wageningen University. Finally, the chair educates new generations of life scientists and bioinformaticians, providing them with the technological knowledge and skills required to not only solve the problems of today, but to meet the challenges of tomorrow.
5	<i>Date of adoption of this description (decision of the EB) (only for filing purposes)</i>	8 November 2021

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## 2.2 Teaching and research remit Biosystematics (BIS)

**Chair holder: Prof. Eric Schranz**

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1	<i>Name of the chair group (in English and Dutch)</i>	Biosystematics (BIS) / Biosystematiek
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	The Biosystematics chair addresses fundamental questions about biodiversity and its origins. The chair collects, analyses, interprets and teaches using an array of approaches from field-based observations, biodiversity collections and bioinformatic analysis of biochemical and genomic data.
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	The mission of WUR, to explore the potential of nature, is also the essence of Biosystematics. The focus on preserving, studying and utilizing biodiversity resonates with societies' rising sense of urgency to protect biodiversity that is increasingly under threat.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	<p>The Biosystematics chair is focused on the origin and maintenance of plant and insect biodiversity, above and below species level. The chair investigates speciation, domestication and plant-animal interactions, and uses phylogenetic patterns and comparative genomics (phylogenomics) to test hypotheses on the underlying processes. It applies a comparative approach to study species-level systematics of insects and plants, including crops, and the geological, ecological and molecular processes that have shaped existing biodiversity in particular clades.</p> <p>The chair extrapolates from fundamental understanding of how and why evolutionary changes have occurred to asking what new changes are feasible, such as the evolution of new traits in crop plants.</p>
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## 2.3 Teaching and research remit Cell and Developmental Biology (CDB)

### Chair holder: vacant

1	<i>Name of the chair group (in English and Dutch)</i>	Cell and Developmental Biology (CDB)/ Cel- en ontwikkelingsbiologie
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	The Cell and Developmental Biology chair studies developmental processes at the (single) cellular level. Central to many developmental steps in the plant life cycle are differentiation events that establish the biochemical and physical composition of the cell to regulate growth and division.
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	The chair does fundamental research on plants that forms the basis for application of plant sciences to various domains of WUR, notably food and the living environment.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	<p>The Cell and Developmental Biology chair studies developmental processes at the (single) cellular level. Central to many developmental steps in the plant life cycle are differentiation events that establish the biochemical and physical composition of the cell to regulate growth and division. Therefore, the chair aims to elucidate how cellular phenomena, like trafficking, polarization and control of gene expression, drive the key processes that determine cell identity and morphogenesis. In addition to such cell intrinsic cues, cell-to-cell signalling spatially coordinates developmental programmes within tissues. As such, cell-cell communication is a major driver for cell fate specification. The special focus is on the identity of regulatory cues, their distribution routes and how they exert their control at the molecular and cellular level.</p> <p>Questions addressed include: How are asymmetric cell divisions orchestrated? How are cell polarity cues distributed and how do they determine cell fate? How does cell-cell communication via plasmodesmata control cell identity? How are biotic and abiotic signals perceived by root cells and how do they affect plant developmental programs? How does cell morphology influence developmental pathways? How and which gene networks determine cellular identity?</p>
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## 2.4 Teaching and research remit Crop Physiology (CSA)

**Chair holder: vacant**

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1	<i>Name of the chair group (in English and Dutch)</i>	Crop Physiology (CSA) / Gewasfysiologie
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	Through combined use of experimentation and modelling, the chair Crop Physiology aims to understand the physiology of individual plants and crops while scaling up basic, physiological processes from sub-plant level to crop level in man-managed systems
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	The chair Crop Physiology forms a link in the knowledge chain from molecular physiology to agronomy and plant breeding, thereby contributing to the design of sustainable crop production, increased resource use efficiency and enhanced product quality.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	The main objective of the chair of Crop Physiology is to unravel the networks of complex interactions at sub-plant, plant and crop level and aggregate information from these networks into knowledge relevant to crop production for diverse groups of stakeholders: crop ecologists, agronomists, farmers, breeders, extension agents, conservationists, policy makers, and others. Crop physiology does that in a unique way by focusing on research questions investigating those processes that are specific for a plant as a member of a community (i.e. whole-plant physiology of plants in a crop stand) and by focusing on those crop stand characteristics that emerge from behaviour of plants that interact with other plants of the crop stand. The main research tools of Crop Physiology include experimentation under controlled and field conditions with advanced measuring equipment and state-of-the-art computational modelling of processes at various levels of aggregation based on thorough systems analysis of crops.
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## 2.5 Teaching and research remit Crop and Weed Ecology (CSA)

**Chair holder: Prof. Niels Anten**

1	<i>Name of the chair group (in English and Dutch)</i>	Crop and Weed Ecology (CSA) / Gewas- & Onkruidecologie
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	To enhance and teach fundamental knowledge of the ecological mechanisms that determine the functioning of crop and associated ecosystems in relation to the agronomic practices and natural and anthropogenic selective forces under which they operate.
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	By blending novel approaches from fundamental ecology and crop science the chair aims to provide the scientific basis for the development of productive sustainable and circular cropping systems that support natural biodiversity and associated ecosystem services.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	<p>The mission of Crop &amp; Weed Ecology (CWE) is pursued along two pillars.</p> <p>The <b>Plant trait to crop community pillar</b> uses a physiological ecology and community ecology approach to understand how plant trait variation affects interactions between plants and between plants and other organisms. It then analyses how this interaction drives the functioning of crop systems (yields, resource-use climate resilience and other ecosystem functions). Key in this regard is research on the role of crop biological diversity (e.g. intercropping or agroforestry).</p> <p>The <b>Quantitative agro-ecology pillar</b> then analyses how this crop functioning interacts with populations of other (wild) organisms (weeds, pests and diseases) with special emphasis on the spatial and temporal dynamics of this interaction. It thus links the community ecological approach of the first pillar to landscape ecology and population biology. We use this knowledge to develop integrated approaches for sustainable pest management, and to further our fundamental understanding of the functioning, adaptation and community dynamics of these wild organisms in agro-ecological systems.</p> <p>CWE employs a combination of innovative modelling well rooted in ecological (game) theory, especially 3D virtual plant modelling, spatial modelling of diseases and pests and weed population models. It combines this with greenhouse and off and on-farm field experiments.</p>
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## 2.6 Teaching and research remit

### Developmental Biology of Biotic and Environmental Interactions (DBE)

**Chair holder: vacant**

1	<i>Name of the chair group (in English and Dutch)</i>	Developmental biology of Biotic and Environmental Interactions (DBE) Ontwikkelingsbiologie van biotische- en omgevingsinteracties
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	The Developmental Biology of biotic and environmental interactions chair studies plant development from tissue to organ formation and how it determines plant architecture including its response to the environment.
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	The chair is firmly embedded within WUR and is a core area in modern plant-related research. Plant architecture is a major component that determines crop yield and quality, fundamental insights on how plants grow and develop is essential to improve agricultural practices and the chair thereby contributes to the WUR domain.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	The chair studies plant development from tissue to organ formation and how it determines plant architecture including its response to the environment. Therefore, a wide range of molecular genetic tools is applied to unravel how the genetic code is used to generate form and function in a spatio-temporal manner.  Questions addressed include: How are plant meristems and stem niches organized or generated de novo? How are cells in the embryo specified? What determines the architecture of root and shoot structures in plants? How is flowering time regulated? How do soil and its inhabiting micro-organisms influence root architecture and function? How root nodules form in the interaction with nitrogen-fixing bacteria?
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## 2.7 Teaching and research remit Entomology (ENT)

**Chair holder: Prof. Marcel Dicke**

1	<i>Name of the chair group (in English and Dutch)</i>	Entomology (ENT) / Entomologie
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	The research and teaching programme of the chair of Entomology addresses fundamental and applied aspects of the biology of insects focusing on (1) multitrophic insect-plant interactions, (2) insects as vectors of diseases of humans and animals, (3) molecular biology and physiology of insects and (4) insects as food and feed.
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	The mission is to unravel the ecology of interactions between insects and other community members by combining ecological studies (population and community levels) with investigations of the underlying mechanisms (subcellular to individual levels). Integrated pest, vector and disease management strategies and applications of insects as food and feed are being developed in both developed and developing countries.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	<p>In insect-plant interactions the chair addresses the dynamics of interactions at the level of individuals with consequences for population and community dynamics at multiple trophic levels (herbivores, parasitoids and predators, and hyperparasitoids). To understand the mechanisms underlying interactions between individuals, processes are investigated at the level of gene transcription and metabolite biosynthesis. This is done for insects as well as their plant resources.</p> <p>In vector biology the biology of haematophagous arthropods is addressed (mosquitoes, ticks) in interaction with their blood hosts (humans and animals) and with the pathogens they transmit, such as malaria, Zika, West-Nile Virus and Usutu Virus. This is taken from the level of individual interactions to regional spatial scales and involves biology, social sciences and geographic information science.</p> <p>In molecular biology and physiology of insects, the molecular basis of sexually dimorphic trait variation in insects and its evolution is investigated as well as the molecular basis of insect neurobiology and brain processes underlying behaviour such as learning.</p> <p>In the research on insects as food and feed the opportunities for using insects as sustainable protein source for humans and livestock within a novel value chain is investigated, by addressing insect nutritional physiology, life-history analysis, behaviour and their immune system. This also involves inter- and transdisciplinary approaches.</p>
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## 2.8 Teaching and research remit Farming Systems Ecology (FSE)

**Chair holder: Prof. Rogier Schulte**

1	<i>Name of the chair group (in English and Dutch)</i>	Farming Systems Ecology (FSE) / Farming Systems Ecology
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	The Farming Systems Ecology chair focuses on the analysis and redesign of sustainable farming systems and foodscapes, so that they deliver multiple benefits to humankind, using natural processes as the starting point.
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	By equipping the actors in the food system with keys to unlock, redesign and transition of farming systems and foodscapes through the experiencing and learning from outstanding examples of farms and foodscapes, the chair contributes to the WUR domain.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	The Farming Systems Ecology chair specialises on the radical redesign of sustainable farms and foodscapes, for contrasting socio-ecological contexts around the world. This encompasses the analysis and design of diversity of future farming systems and foodscapes, which is referred to as 'lighthouse farming systems', as well as the elucidation of transition pathways theretoward.  To deliver on this, the chair leads the development of integrated systems analyses, bringing together the knowledge and expertise of numerous disciplines in a holistic framework. The unit of assessment is the foodscape, which is defined as food systems in a landscape setting; as such the research pertains both to actors and their context of natural resources, and multi-disciplinary work includes expertise in systems modelling, agro-ecology, agronomy, co-innovation, policy formation and immersive education.  This knowledge is brought together in a platform of simulation models that facilitate what-if scenario analyses, for use as Discussion Support Tools for community-supported sustainable land management. The digital approach is combined with hands-on, empirical assessments of outstanding examples of sustainable farms and foodscapes in all continents, which are brought together in a Global Network of Lighthouse Farms. Together with field experiments at the university farms, this network represents a global outdoor laboratory and classroom. Virtual Reality and Augmented Reality methods are developed to bring these farms inside classrooms and modelling platforms.
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## 2.9 Teaching and research remit Farm Technology (FTE)

**Chair holder: Prof. Peter Groot Koerkamp**

**Full professor: Prof. Eldert van Henten**

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1	<i>Name of the chair group (in English and Dutch)</i>	Farm Technology (FTE) / Agrarische Bedrijfstechnologie
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	The chair carries out research and education to enhance, exploit and disseminate the potential of technology in agricultural production systems to fulfil the needs of mankind and nature in a sustainable way. The focus is on design methodologies, with special attention for animal production systems, and on operational management and robotics of biosystems, with special attention for plant production systems.
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	The chair fits in the WUR domain by developing technological tools and methods for sustainable production of food, feed and biomass, addressing the challenges of limited natural resources, plant-soil-animal health, environmental impact and quality and quantity of labour.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	FTE combines methods and tools from technical sciences with biological (plant, animal, soil), environmental, agricultural and social sciences to study, understand, manage and design biosystems. Technical components, biological organisms (plants, animals) and human interactions are combined. Scientific challenges are in understanding the impact of and dealing with non-linear dynamic response, errors in measured data and control actions, disturbances from outside the systems (weather, price levels), uncertainty and (spatial) variation within the systems (between biological entities, between farms), and apparent trade-offs in current systems to improve performance on multiple aspects of sustainability at the same time. The generic comprises a cycle of sensing, data processing and modelling of biosystems (formal understanding), making of algorithms to support management or directly control robotic and autonomous machines and systems. This is done at operational (machine intelligence), tactical (technological solutions), and strategic (innovative system designs) levels. The focus is on six research lines: <ol style="list-style-type: none"><li>1. Active perception and robotics;</li><li>2. Advanced machine vision;</li><li>3. Self-learning in autonomous systems;</li><li>4. Modelling and control algorithms;</li><li>5. Design of sustainable systems;</li><li>6. Assessment of environmental impacts.</li></ol>
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## 2.10 Teaching and research remit Genetics (GEN)

**Chair holder: Prof. Bastiaan Johannes Zwaan**

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1	<i>Name of the chair group (in English and Dutch)</i>	Genetics (GEN) / Erfelijkheidsleer
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	The interrelationship between genetics, heredity, and evolution is the focus of research of the chair. Central is the study of genetic variation that ranges from the processes that produce it (mutation, recombination), the factors that have shaped its architecture in the past, to the factors and processes that determine its fate.
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	The chair group provides fundamental knowledge of the mechanisms of genetics and the more inclusive mechanisms of heredity, and how these affect and regulate phenotypic variation. This is done within the unifying framework of evolutionary theory and the focus is on fundamental questions and concepts rather than on specific phenotypes or organisms. This focus will contribute to understanding the generation, maintenance, and function of biological variation. This in turn fuels the mission of WUR on applying this knowledge to improve the quality of life.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	Three research themes are defined that encompass crucial and well-defined areas of research in the area of Heredity, Genetics, and Evolution. (i) Organisation of heritable variation, (ii) Genetics and levels of selection, and, (iii) Genetics of adaptation. There are extensive cross-links between them and together they contribute to the long-term aim of the chair to not only unravel the genetics of evolutionary change and to investigate whether and to what extent evolution is predictable.
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## 2.11 Teaching and research remit Horticulture and Product Physiology (HPP)

**Chair holder: Prof. Leo Marcelis**

1	Name of the chair group (in English and Dutch)	Horticulture and Product Physiology (HPP) / Tuinbouw en Productfysiologie
2	Brief summary of the (teaching and research) remit in max 35 words	The role of the Horticulture and Product Physiology chair is to foster the science of the production chain for crops produced under protected cultivation. The chair contributes to the education and training of future executives in the horticultural sector.
3	Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words	Physiology, production, and pre- and post-harvest quality of vegetables cut flowers and pot plants contribute to the sustainable production of high-quality horticultural products. The chair's contributes thereby directly to the field Food, Feed and Biobased Production, which is one of the three core field within the WUR domain of healthy food & living environment.
4	Concise description of the remit regarding teaching, research and value creation, max 150-200 words.	<p>The focus of the chair is on greenhouse horticulture and the post-harvest quality of products produced in greenhouses and vertical farms as well as the post-harvest quality of tropical fruit. Responses of physiological processes to the environment are studied aiming to predict and control the phenotype of the plant and plant products.</p> <p>Growth and development of plants as well as product quality are studied as emergent properties of underlying physiological and genetic processes.</p> <p>Research fields such as phenotyping, (LED) light regulation of plant processes and functional-structural plant modelling are gaining increasing prominence.</p> <p>The research of the group is centred around three themes:</p> <ul style="list-style-type: none"> <li>• <b>Photosynthesis</b> Photosynthesis is the driving force for most trophic systems on Earth. Basic research is conducted into understanding the regulation and limitations of photosynthesis.</li> <li>• <b>Morphogenesis</b> The function and structure of a plant show strong interactions. These interactions are studied in an integrated way.</li> <li>• <b>Product physiology</b> The quality of a fruit, a flower, or a pot plant does not end when it leaves the grower.</li> </ul>
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## 2.12 Teaching and research remit Applied Mathematics (MAT)

**Chair holder: Prof. Peter van Heijster**

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1	<i>Name of the chair group (in English and Dutch)</i>	Applied Mathematics (MAT) / Toegepaste Wiskunde
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	The chair is responsible for all mathematics education at Wageningen University and performs research on a broad variety of topics, in which mathematical modelling and methodology is applied to real life systems in agriculture, plant sciences, animal sciences, ecology, and socio-economics.
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	The chair Applied Mathematics takes, together with the chair Statistics, a central position within Wageningen University, since quantitative approaches become more and more important within the Life Sciences, Social Sciences and Environmental Sciences.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	Applied Mathematics, as part of the cluster Biometris, helps to cover a whole line of research, from fundamental development of mathematical methods to commercial application of this knowledge and can be characterized as "Quantitative methods brought to life".  The chair Applied Mathematics cooperates with many other chair groups on a great variety of topics. Examples of current research are the resilience of socio-economic systems, the dynamics of plant-insect interactions, the identifiability of systems biology models, patterning on plant cell walls in relation to microtubular dynamics, damage detection in water supply systems, trichome pattern formation on plant leaves, stochastic processes in synthetic biology, and matrix models and survival analysis for population dynamics.
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## 2.13 Teaching and research remit Applied Statistics (MAT)

**Chair holder: Prof. Fred van Eeuwijk**

1	<i>Name of the chair group (in English and Dutch)</i>	Applied Statistics (MAT) / Toegepaste Statistiek
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	The chair group Applied Statistics is responsible for the statistics courses of WUR at BSc, MSc and PhD level. The group further develops courses for commercial and non-commercial organizations outside WUR, especially in the area of statistics and data science for life and environmental sciences.  The research programme covers a wide spectrum of topics that are relevant to WUR with a focus on statistical models for genetics, genomics and phenomics.
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	In all domains of WUR (Plant, Animal, Food, Environmental, Social Sciences), reproducible research requires design of experiments and surveys before data collection and statistical analysis after data collection. A strong statistics group is essential to achieve high quality research. The statistics group should provide education, consultation and support as well as tools, methods and software to address quantitative questions in the WUR domains. Furthermore, imposition and maintenance of statistical prescriptions guarantees research integrity.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	The research of the chair is determined by statistical genetics, genomics and phenomics. This includes mixed models, penalized regression, functional data analysis, network methodology, stochastic differential equations, Hidden Markov models and various Bayesian approaches to plant adaptation and genotype by environment interaction. In addition, machine learning and deep learning techniques are studied and implemented.  Plant phenotypes are statistically modelled as functions of DNA polymorphisms, time, environmental inputs and omics data. There is active collaboration with physiologists, geneticists, plant breeders and further biologists. Increasingly, the modelling approaches are reminiscent of stochastic systems genetics and biology.  The statistical work on genetics, genomics and phenomics is embedded in national and international research projects (STW, NWO, EU, BMGF). An important part of the research is done in collaborative projects with companies, especially plant breeding companies.
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## 2.14 Teaching and research remit Nematology (NEM)

**Chair holder: Prof. Geert Smant**

1	<i>Name of the chair group (in English and Dutch)</i>	Nematology (NEM) / Nematologie
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	The chair studies the biology of nematodes and associated organisms to understand and predict their functioning in agricultural and natural ecosystems. This is accomplished by hypothesis-driven research on interactions between nematodes and (a)biotic environmental factors.
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	The chair's focus on nematodes as key factors in soil resilience and nutrient cycling, and as a persistent threat to animal, human and plant health therefore fits well within the mission of Wageningen University to excel in science for impact by generating knowledge to secure the production of food in coming years.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	<p>The chair's research objectives are to unravel:</p> <ul style="list-style-type: none"> <li>• the molecular and genetic basis of nematode-plant interactions with special attention to the role of nematode secretions, plant (immune) receptors and nematode-induced changes in plant development and growth.</li> <li>• the function and structure of secretory (glyco)proteins of parasitic nematodes and related helminths modulating immune responses in animals and humans.</li> <li>• the roles of nematodes and protists in their microbial context with regard to soil food web functioning with a main focus on plant health, growth and development.</li> <li>• the molecular and genetic mechanisms that underlie development, lifespan, plasticity and adaptation of the model organism <i>Caenorhabditis elegans</i> in a diverse range of abiotic and biotic environments.</li> </ul> <p>To contribute to science-informed policy making in the Netherlands and the EU, the chair actively engages with stakeholders within (inter)national consortia of research institutes, industry and governmental organizations. It achieves valorization of fundamental knowledge via public-private partnerships with plant breeding and biotech companies and agricultural consultancy firms.</p>
5	<i>Date of adoption of this description (decision of the EB) (only for filing purposes)</i>	8 November 2021

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## 2.15 Teaching and research remit Plant Breeding (PBR)

**Chair holder: Prof. Richard Visser**

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1	<i>Name of the chair group (in English and Dutch)</i>	Plant Breeding (PBR) / Plantenveredeling
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	Plant Breeding is responsible for research and education in the field of crop plant improvement. The main drivers are understanding fundamental processes in a broad range of relevant research fields which can be implemented to increase genetic improvement of crop plants.
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	Plant Breeding is indispensable to ensure food, feed and biobased products. In providing food security and food safety of high-quality products with low environmental impacts for a growing world population in a sustainable fashion it contributes to the mission of Wageningen University and Research.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	<p>Purpose of the research in plant breeding is to deploy efficient methodologies and well-chosen resources to reach optimal genetic improvement of crop plants. Since the field is extremely broad and characterised by its multi and transdisciplinary nature it requires education and research at different integration levels: from molecule to cell and plant and from individual plant to population. This requires, next to the general breeding and crop knowledge, knowledge of and interaction with bioinformatics, genomics, crop physiology, developmental biology, phytopathology, quantitative genetics and statistics. Inclusion of modern techniques including high throughput phenotyping and artificial intelligence will ensure a faster and more efficient development of appropriate varieties.</p> <p>By providing foundational and specialized education (courses, in house training, online courses) in the field of plant breeding the chair disseminates and transfers knowledge to companies and foreign research organizations who are involved in practical breeding.</p>
5	<i>Date of adoption of this description (decision of the EB) (only for filing purposes)</i>	8 November 2021

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## 2.16 Teaching and research remit Plant Physiology (PPH)

**Chair holder: Prof. Christa Testerink**

1	<i>Name of the chair group (in English and Dutch)</i>	Plant Physiology (PPH) / Plantenfysiologie
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	The chair Plant Physiology of Wageningen University aims to contribute to the understanding of how plants function. Interest is particularly in how plants respond to changes in their sometimes hostile environment. The chair has the mandate to secure a broad fundamental knowledge of plant physiology.
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	The chair links fundamental research on plants to various applications of plant sciences and thereby contributes to knowledge on plants and their interactions with the environment, a basis for smart climate agriculture, part of the domain of WUR.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	The research of the chair aims to provide fundamental mechanistic insight into how endogenous plant factors interact with environmental cues, which control plant fitness, growth, development, and reproduction. The goal of the chair is to create impact by understanding the functioning of plants in a dynamic natural environment through a strong core of fundamental research, but with a clear view to application. Therefore the work of the chair is not only focused on model species (Arabidopsis and tomato), but also on a wider range of global crop species.  Environmental plant physiology is essential for the development of climate smart agriculture.
5	<i>Date of adoption of this description (decision of the EB) (only for filing purposes)</i>	8 November 2021

## 2.17 Teaching and research remit Plant Production Systems (PPS)

**Chair holder: Prof. Ken Giller**

1	<i>Name of the chair group (in English and Dutch)</i>	Plant Production Systems (PPS) / Plantaardige Productiesystemen
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	To integrate biological knowledge to analyse and design sustainable production systems for crops (including integration with livestock), from farm to global scale, focused on resource use efficiency and equitable management of natural resources.
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	Urgent societal issues such as global food security, agricultural and environmental policies, competition for natural resources, food-feed-fuel interactions and global environmental change, lie at the heart of the mission of WUR. The chair provides grounded, quantitative analysis to understand and respond to these challenges, and to allow the design of sustainable production systems.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	Societal problems require analysis at multiple levels, and a key research issue is scaling from the field to farm, region and the global level. The chair's research and teaching approach is rooted in the tradition of C.T. de Wit, combining empirical knowledge and production ecological theory with understanding of farming systems derived from surveys and databases. Methodology development and application are central to understanding current systems and design of new production systems that contribute to addressing societal problems of global significance. Various modelling approaches based on simulation of crop and animal production, bio-economic optimization and statistical techniques are key. The chair also works on analytical and explorative methods to assess the scope for intensifying or improving current systems. An interdisciplinary approach is central, as the issues deal with complex human systems. The focus lies firmly in the natural sciences but close collaboration with groups from social sciences (e.g. economics, rural sociology, communication science) furthers integrated assessment.
5	<i>Date of adoption of this description (decision of the EB) (only for filing purposes)</i>	8 November 2021

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## 2.18 Teaching and research remit Phytopathology (PHP)

**Chair holder: Prof. Gert Kema**

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1	<i>Name of the chair group (in English and Dutch)</i>	Phytopathology (PHP) / Fytopathologie
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	PHP investigates pathogenic and beneficial interactions between microbes, i.e. bacteria, fungi and oomycetes, and plants, ranging from epidemiology to molecular interactions, population dynamics and microbial ecology.
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	PHP focusses on diseases caused by microbes, which have a huge impact on agriculture and society at large. Disease control is important for the WUR domain.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	The chair's mission is to increase the fundamental understanding of the cellular, molecular and biochemical mechanisms underlying microbial infection and host defence responses, and the forces driving evolution of pathogens. The chair studies microbes with distinct lifestyles (biotrophs, necrotrophs, hemi-biotrophs) and with different infection strategies (colonising leaves, stems and/or roots). Research is performed in an integrated manner, involving both the microbe and the host plant at all levels. With the availability of ever larger numbers of genome sequences, in-depth comparative and functional genomics studies, understanding is deepened of (i) pathogen infection mechanisms, (ii) processes involved in pathogen evolution and speciation, (iii) host susceptibility and immunity, and (iv) mechanisms underlying microbial antagonism. Furthermore, applied aspects of the diagnosis and epidemiology of plant diseases are studied. Crop- and production systems-oriented research is performed in multidisciplinary collaborations with local, national and international partners. The overall aim of the research is to generate and disseminate knowledge that enables breeders and growers to develop novel strategies for crop protection.
5	<i>Date of adoption of this description (decision of the EB) (only for filing purposes)</i>	8 November 2021

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## 2.19 Teaching and research remit Virology (VIR)

**Chair holder: Prof. Monique van Oers**

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1	<i>Name of the chair group (in English and Dutch)</i>	Virology (VIR) / Virologie
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	The chair studies and teaches the interaction of arboviruses, insect and plant viruses with their hosts and vectors, from fundamental and applied angles, emphasizing ecological, molecular and biotechnological aspects.
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	The chair aims to unravel the determinants for disease, virus transmission, as well as vector competence. Acquired knowledge is used for durable disease management via molecular plant breeding, vaccines, biological control and in insect mass rearing. This fits in the general WUR domain.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	<p>The chair's mission is to expand knowledge on insect-vectored and insect-infecting viruses. Viruses are obligate intracellular parasites with intimate relationships with specific host species to replicate. Many viruses either infect insects or rely on insect vectors for their spread to new hosts. The latter category includes important plant viruses as well as so-called arboviruses, that infect animals including humans. In light of climate changes, insect-transmitted viruses are predicted to spread further into temperate climate zones, posing major threats to yet unexposed regions.</p> <p>The main research topics are:</p> <ol style="list-style-type: none"><li>the mechanism(s) of host defence and viral counter defence,</li><li>determinants of vector competence,</li><li>viruses-triggered changes in insect behaviour,</li><li>mechanism behind covert virus infections and associated disease outbreaks.</li></ol> <p>The gained knowledge is being applied to develop mitigation/prevention strategies against emerging (zoonotic) arboviruses, plant viruses and insect viruses.</p>
5	<i>Date of adoption of this description (decision of the EB) (only for filing purposes)</i>	8 November 2021

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Corporate Governance & Legal Services

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The mission of Wageningen University & Research is "To explore the potential of nature to improve the quality of life". Under the banner Wageningen University & Research, Wageningen University and the specialised research institutes of the Wageningen Research Foundation have joined forces in contributing to finding solutions to important questions in the domain of healthy food and living environment. With its roughly 30 branches, 6,500 employees (5,500 fte) and 12,500 students, Wageningen University & Research is one of the leading organisations in its domain. The unique Wageningen approach lies in its integrated approach to issues and the collaboration between different disciplines.

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