SESSION TYPE-NAME	SESSION DESCRIPTION	SESSION CHAIR(S)
MINI-SYMPOSIUM A Systems Approach to Decipher Plant Cell Wall Dynamics	Plant cells are enclosed by the dynamic structure of the cell wall, a vital component that influences plant growth and interactions with the environment. Plant cell walls not only serve as both the structural framework and protective barrier for plants, but they also hold fundamental economic importance in the production of materials like cellulose, wood, and various plant fibers. This essential function is regulated by the Cell Wall Integrity (CWI) maintenance mechanism, which constantly monitors the structural and functional integrity of cell walls and fine-tunes cell wall composition, mechanics, and the cell's physiological processes when they are altered. Hence, cell walls are highly dynamic. Understanding cell wall processes requires a thorough understanding of cell wall mechanics, structure, chemistry, and biology. Our ICAR 2024 session aims to unite diverse scientific research areas, including biochemistry, molecular biology, biophysics, and bioinformatics, within the realm of cell wall research, encouraging innovative interdisciplinary approaches that are currently scarce in the field. By exploring the intricate links between CWI maintenance signaling, development, immunity, and downstream responses, we aim to comprehensively understand CWI mechanisms across various tissues, organs, and species, particularly within a dynamic and temporal context. Emerging real-time, high-resolution microscopy tools promise insights into dynamic CWI-related processes, while a multi-omics-based approach aids in understanding regulatory networks, signaling pathways, and key regulators. Integration of this knowledge into regulatory mechanistic models further broadens our understanding of various physiological processes. This view is critical to understanding how changes in biopolymer composition and structure affect plant development, stress responses, and overall function, which is crucial for efficient plant material use, processing, and breeding to enhance resistance to adverse environmental conditions and the production of better biomaterials. This session aims to foster interdisciplinary collaboration in plant biology and uncover groundbreaking discoveries that will shape the future of plant science.	Nancy Soni, Norwegian University of Science and Technology (NTNU), Klaudia Ordyniak, Umeå Plant Science Centre
MINI-SYMPOSIUM Adaptations to Extreme Climate in Arabidopsis Extremophyte Relatives	Extremophytes, plants that thrive under extreme climate, represent relatively untapped genetic resources for their adaptations in multiple abiotic stresses. Arabidopsis extremophyte relatives serve as excellent models to study adaptations in harsh environments because of the wealth of genetic information available for Arabidopsis that is transferable to these extremophyte models. Multi-scale comparisons between diverse Brassicaceae extremophytes with Arabidopsis have provided insights into genetic mechanisms underlying the innovative adaptations that are not present in Arabidopsis, for example, adaptations to multi-ion salt stresses in Schrenkiella parvula; to salinity, cold and low nutrient stresses in Eutrema salsugineum; to heavy metal in Arabidopsis halleri; to drought, heat, UV stresses in Anastatica hierochuntica; to high altitude in Crucihimalaya himalaica and Eutrema ssp.; to flooding in certain Brassica napus species. In this mini-symposium, we plan to showcase cutting-edge and exciting extremophyte biology research from a diverse group of researchers (male, female, LGBT-Q, and underrepresented groups) at different stages of their career paths. We expect this session will interest the Arabidopsis research community employing systems biology techniques to explore the diverse molecular mechanisms that contribute to plant adaptations to challenging environments, as well as evolutionary biologists and plant researchers developing resilient food and bioenergy crops in the era of climate change.	Pramod Pantha, Louisiana State University, Guannan Wang. Stanford University
MINI-SYMPOSIUM Arabidopsis Beyond Arabidopsis -	This mini symposium will bring together researchers who are using Arabidopsis as a system to ask non-traditional questions that have implications beyond Arabidopsis biology. Arabidopsis research has made significant impact for plant	Sridevi Sureshkumar, Monash

Towards Generalisable Principles in Biology	biology but one aspect that is often missed or somewhat downplayed is that it is a great model that has made significant contributions to our general understanding of biology that extends beyond Arabidopsis/plants and have wider implications to all systems. This symposium will highlight Arabidopsis to be not only a model system known for plant biology, but also for inferring generalisable principles in biology. Arabidopsis research has diversified in ways that were not envisaged. Well known examples for such work include the use of Arabidopsis to understand climate change and adaptation, uncovering the principles of small RNA and epigenetic gene silencing, study of the mutation rates for evolutionary analysis, uncovering principles of development etc. More recently, Arabidopsis is also used as a model to address unusual questions (e.g, Arabidopsis as a system to study repeat expansions that are mostly causal for human genetic diseases, chemical genetics in Arabidopsis that reveals novel pathways, field studies that allow inferring adaptation and predicting the effects of climate change, transgenerational memory etc) and this symposium will bring together such speakers and present a novel perspective on Arabidopsis research.	University, Sourav Mukherjee, Monash University
MINI-SYMPOSIUM Cell Fate Control and Organogenesis: Towards Understanding and Imaging Complex Tissues	Control of cell fate, cell growth, and the coordination of the two are critical for the formation of functional organs. Cells across different tissue layers in a growing organ need to coordinate and synchronize their fates and growth rates to generate robust organ structures to perform their Specialized functions. Moreover, cell fate can also be altered or reprogrammed to form de novo plant organs by external agents such as bacteria, fungi and insects, which adds another layer of complexity and intrigue. How the complex orchestration of gene regulatory networks, signaling pathways and epigenetic mechanisms lead to cell fate and growth rate determination to promote organogenesis remains an area of active research. Developments in imaging technologies have been increasingly helpful in tracking the spatiotemporal dynamics of cell division and differentiation to understand tissue level growth patterns and develop models to simulate how organs are shaped. In short, many underlying mechanisms as well as cellular dynamics at tissue and organ level remain to be investigated. This session aims to capture emerging questions in organogenesis and cell fate control as well as highlighting the technological advancements in imaging, 3D image analysis of live-growing organs, and single-cell/nucleus sequencing approaches. This session will cover topics ranging from epigenetic control of fate to externally induced organogenesis and fate manipulation, to tissue-wide cell growth coordination in organogenesis. In addition to a focus on mechanistic understanding, this session will also highlight cutting-edge techniques such as optimized approaches for non-destructive deep tissue imaging, 3D image analysis, and single-cell/nucleus sequencing.	Margot Smit, ZMBP, Tuebingen, Yan Ma. Gregor Mendel Institute of Molecular Plant Biology, Avilash Singh Yadav, Cornell University
MINI-SYMPOSIUM Cell-type Specific Responses for Plant Resilience to Stress	The dawn of spatial omics is rapidly transforming our understanding of plant responses to stress, and interaction of plants with other organisms. Empowered by state-of-the-art technologies that allow profiling single cells, such as single-cell-RNA-seq, ATAC-seq and in situ multiplexed fluorescence hybridization, an increasing number of laboratories are focusing on understanding the specialization of cell-types, and their communication with surrounding and distal cells, to cope with different sources of stress. Seminal results are challenging the traditional assumption that all plant cells have the same potential to handle stresses towards preserving whole organism homeostasis, in favour of the view that different cell-types have a specific role in those responses. In this workshop, we aim at covering the latest results about the molecular processes leading to cell-type specific acquisition of different capacities to handling specific biotic and abiotic stresses. To that end, we welcome studies addressing cell-type specific responses to interactions with microbes (beneficial and pathogenic) and/or	Ignacio Rubio-Somoza, Centre for Research in Agricultural Genomics (CRAG)

	different kinds of biotic stresses (i.e. drought/flooding, temperature, nutrient availability). Researchers from all stages of their career are encouraged to discuss their findings in this workshop. Abstracts will be selected based on diversity and scientific excellence.	
WORKSHOP- Chemical Genetics in Arabidopsis Research: Recent advances and Applications	Chemical genetics stands at the crossroads of chemistry and biology, employing small molecules to probe and dissect protein functions and cellular processes. In Arabidopsis research, this discipline has seen profound progress, marking significant milestones in the understanding of plant cellular functions. Researchers have developed a large collection of small molecule ligands that can transiently interfere with a wide range of plant developmental and cellular processes, including membrane trafficking, plant hormone signaling, and cellulose biosynthesis. Traditional genetic approaches often face roadblocks when multiple homologous genes function redundantly or when gene disruptions result in non-viability. Chemical genetics, with its acute and reversible interventions, as well as its ability to target homologous proteins, offers a solution to these issues. This workshop will feature expert speakers who will cover diverse topics of chemical genetics in Arabidopsis. They will discuss high-throughput chemical genomics screen, target identification process, comprehensive mode of action studies, and recently developed chemical genetic tools.	Xiaohui Li, Purdue University
MINI-SYMPOSIUM Chromatin at Single-cell and Single-molecule Resolution	This symposium focuses on Arabidopsis research highlighting new discoveries in the realm of chromatin features at unprecedented resolution. This includes single-cell and single-molecule approaches to chromatin accessibility, histone modifications, and DNA methylation amongst other topics. Technology driven approaches including spatial, microscopy-based genomics will also be included.	Josh Cuperus, University of Washington-Seattle
MINI-SYMPOSIUM Deciphering the Secrets of Microbiomes in Promoting Stress Resilience in Plants – a Strategy for Achieving Agricultural Sustainability	Climate change has engendered pronounced shifts affecting human health, either directly or indirectly. Central to human well-being is the food we consume, which mirrors the vitality of the plant and the environment it is nurtured in. The rampant utilization of chemical fertilizers and pesticides has triggered a surge in new plant diseases, soil biodiversity loss, and pathogen resistance, among other challenges. Moreover, prolonged drought, escalated temperatures, and other abiotic factors contribute to a further decline in crop productivity. There's an imperative for identifying alternative strategies for enhancing crop yields without additional manipulation of Earth's environment, favoring methods that embody sustainability. Presently, the employment of beneficial soil microbes for promoting plant growth under diverse stress conditions is emerging as a promising field. Extensive work across various labs has demonstrated the potential of rhizosphere microbes in fostering plant tolerance against multiple stresses. Arabidopsis is serving as an accessible toolkit for unraveling the molecular mechanisms leveraged by these beneficial microbes to support tolerance under stress conditions. This session seeks to assemble individuals engaged in the plant-beneficial microbe interaction domain, to consolidate expertise, address challenges, and propel solutions for sustainable agriculture through the deployment of beneficial microbes.	Anamika Rawat, King Abdullah University of Science and Technology, Baoda Han, King Abdullah University of Science and Technology
MINI-SYMPOSIUM Dynamic Plant Cells: Organelle Dynamics and Cell Division During Development	Plant growth, development, and reproduction rely on cytoskeleton-based intracellular motility, which includes organelle movement, polarized protein localization, and cell division. The dynamic cytoskeletal network not only is responsible for the segregation of genetic material during cell division but also brings about polarized distributions of intracellular molecules and organelles as well as ordered deposition of macromolecules outside the plasma membrane. Therefore, uncovering mechanisms that regulate organelle motility and cell division is essential for us to understand plant growth and development. The proposed symposium is aimed at bringing together colleagues who Are actively	Arif Ashraf, Howard University, Carolyn Rasmussen, University of California Riverside, Bo Liu, University of

	exploring the following tentative subjects in Arabidopsis and other plant species: (1) New tools and technologies in plant cell biology, (2) Organelle dynamics in plant cell growth, (3) Cytoskeletal remodeling in responses to in/external cues, (4) Cytoskeletal basis of anisotropic cell expansion for tissue growth, (5) Endomembrane remodeling in cell polarization, (6) Proliferative and informative cell divisions in plant development, (7) Division plane determination in plant cells. Discussions on these proposed topics will showcase what studies employing Arabidopsis, crop plants and emerging model organisms could bring insights into the rules of plant life through multidisciplinary approaches.	California, Davis, Jianping Hu, Michigan State University
MINI-SYMPOSIUM Environmental and Tissue-Specific Regulation of Plant Circadian Rhythms	The circadian clock provides extensive control of plant growth and developmental responses by coordinating the function of major signaling pathways according to environmental conditions. For that, a myriad of predictable (i.e. daily light and temperature oscillations) and unpredictable (i.e. biotic or abiotic stress) environmental signals converge in the regulation of the clock function. Remarkably, despite being widely conserved across cells in the entire organism, the plant clock is regulated in a tissue-specific manner. Thus, understanding how environmental and tissue-specific factors regulate plant circadian rhythms, will provide fundamental knowledge to improve plant (and crop) adaptation to future agricultural conditions.	Jose Pruneda-Paz, University of California, San Diego, Dawn Nagel, University of California, Riverside
MINI-SYMPOSIUM Epigenetics	Epigenetic modifications have emerged as an important regulatory mechanism for versatile biological processes. Although the DNA in each nucleus of an individual is essentially identical, the way it is interpreted by the cell is dependent on its spatial and environmental context. The proposed mini symposium will feature the latest exciting discoveries of histone and DNA modifications on gene regulation, genome organization, development, and environment as well as innovative technology to unravel the fundamental epigenetic mechanisms.	Xuehua Zhong, Washington University in St. Louis, Robert Schmitz, University of Georgia
MINI-SYMPOSIUM Epigenome and Epitranscriptome in Environmental Stress Signaling and Memory	The intricate relationship between plants and their environment, as explored through the lenses of epigenomic and epitranscriptomic dynamics, constitutes a complex and continually evolving field of research. Plant adaptability to changing environments is underscored by dynamic adjustments in the epigenome and epitranscriptome, shaping the plasticity of plant phenotypes. Recent research has predominantly focused on unraveling pathways that transmit environmental cues to chromatin and RNA, elucidating how these cues influence specific gene sets in diverse cell types, tissues, or organs to initiate adaptive responses. A captivating facet of this exploration lies in understanding whether these mechanisms empower plants to retain a memory of past environmental challenges. Plants employ somatic stress priming to adjust growth and development to chronic or recurrent stress events. This priming, activated by various biotic and abiotic stressors, can extend into progeny as intergenerational or transgenerational stress memory. Despite substantial interest and the description of various stress memory phenomena, the underlying mechanisms remain elusive. Epigenetic modifications, including DNA methylation and histone modifications, have been implicated in diverse priming responses to environmental stresses, suggesting roles in short-term and long-term memory. Novel technical approaches, such as epigenome editing and cell-specific approaches, may provide tools to establish causal relationships. Understanding the contributions of epigenomic and epitranscriptomic dynamics to adaptation is pivotal for predicting plant responses to climate change, especially in the face of adverse conditions like elevated temperatures, drought, flooding, and intense light. Harnessing the potential of epigenome and epitranscriptome mechanisms holds promise for enhancing crop yield and future-proofing food security.	Ullas Pedmale, Cold Spring Harbor Laboratory, Clara Richet-Bourbousse, IBENS-CNRS-PSL University, Isabel Baurle, University of Potsdam

WORKSHOP- Evolutionary Plant Systems Biology for Climate Adaptation	Climate change is threatening biodiversity and sustainable agriculture. Hence, understanding how plants systemically respond and adapt to unfavorable environments is now an urgent area of research. Until recently, traditional research approaches have focused on individual genes and their contribution to individual biological processes, leading us to overlook the more complex interdependencies that characterize plant life, even at the molecular scale. Plant systems biology aims to generate and integrate large datasets to close this gap and understand biological regulation from molecules to whole organisms. However, nothing in biology makes sense except in the light of evolution. Technological advances in systems-level data generation tools (including genomics, transcriptomics and proteomics) are now enabling researchers to discover conservation, diversification and convergence in biological networks across species, extending the reach of systems biology over millions of years in evolutionary time. The ambition now is that discovering how biological networks in the distant past evolved in response to climatic changes might provide inspiration for ways to enhance climate resilience in our current agricultural crops and in our natural ecosystems. In this community mini symposium, we present talks by scientists from diverse backgrounds who are taking on this challenge and developing the field of evolutionary systems biology to help address the climate crisis.	Ting-Ying Wu, Institute of Plant and Microbial Biology, Academia Sinica, Devang Mehta, Department of Biosystems, KU Leuven
WORKSHOP-MONDAY From Arabidopsis to Crops: Unveiling the Secrets of Elemental Nutrient Uptake, Allocation, and Biofortification	Plants have evolved highly effective transport, sensing and signaling systems to ensure acquisition of sufficient minerals for growth and development. While macronutrients such us nitrogen and phosphorous limit plant growth and productivity, micronutrients such as iodine, iron, selenium, and zinc are also important for plant functions and human health. This workshop will explore the fundamental mechanisms of plant elemental nutrient uptake, allocation, and homeostasis, with a focus on translating these insights into crop improvements as well as the development of biofortified crops. We will discuss the latest research on root physiology, membrane transporters, and regulatory pathways, highlighting how these can be manipulated to improve the nutritional quality of food crops. It is important to mention that Arabidopsis has been at the forefront of plant gene functional biology in elemental research. However, cases of success in translation biology from Arabidopsis to crops, and vice-versa, will be considered for this session.	Pedro Humberto Castro, BIOPOLIS-CIBIO, University of Porto, Christian Dubos, Institut for Plant Sciences of Montpellier (IPSiM), Nijat Imin, Western Sydney University
MINI-SYMPOSIUM From Perception to Memory: How Plants Adapt to Climate Change	Global warming and the increasing frequency of heatwaves are adversely affecting crop yields and food supplies. Therefore, understanding how plants adapt to varying temperatures is crucial. This session will explore the fundamental mechanisms through which plants perceive, respond to, and even 'memorize' temperature variations, aiding their adaptation. We encourage the submission of abstracts that describe the sophisticated set of thermosensory, thermomemory, and other pathways coordinating cell biological and developmental responses to heat stress. By unveiling recent advances in this field, the goal of this session is to provide insights into breeding practices that could strengthen crops against the unpredictable fluctuations of the climate	Justyna Olas, IGZ e.V.
WORKSHOP- Genomic Features and Mechanisms of Mutation	Genomic variation is the basis of selection and adaptation of organisms to changing environments. Availability of genomic information allows characterization of point mutation and structural variation with comparative genomics, experimental evolution and population genetic analyses on different scales: within organisms, populations, species. This session will examine recent work characterizing the rate and spectrum (point mutations, small and large scale deletions, translocations, etc.) of mutation across the genomes of Arabidopsis and other plants. We will discuss mechanisms of mutation, including DNA repair and	Ksenia Krasileva, University of California, Berkeley

	other mechanisms and correlated genomic and epigenomic features. We will also include the role of TEs in generation of genomic variation and examine the influence of the environment on these processes. This session will provide an opportunity to build a community interested in biology of plant genomes, mechanisms, and consequences of genomic diversity.	
MINI-SYMPOSIUM Hormonal Influence on Plant Form	Phytohormones play instrumental roles in plant growth and development. The influence of hormones either within tissues or across organs is critical for morphogenesis during both vegetative and reproductive phases. While unique functions have been linked to individual classes of growth regulators, there are also many examples of crosstalk between hormones to influence organ formation in plants. Hormone properties that may be permissive or restrictive to plant growth can include gradients and gene regulation. In addition, hormones can play instructive roles in modulating cell size, cell proliferation, cell elongation, and/or cellular differentiation. This session will focus on recent advances in our understanding of hormonal control of plant development, primarily using Arabidopsis as a model. Relevant abstracts using other plants will also be considered.	Dior Kelley, Iowa State University
MINI-SYMPOSIUM Light and Warm Temperature Crosstalk in Plants: a Concerted Response to Optimise Growth and Fitness	Both light and temperature are essential cues regarding plants' growth, reproduction and optimal survival. Light as a separate cue has been extensively studied over the years. Warm temperature signalling and integration on the other hand is a newer study field underlined by rapid climate change and the need to maintain heathy yields in agricultural crops. Light and temperature signalling are also interconnected through common receptors and downstream signalling components, although sometimes the two signalling cascades have opposing effects, like in the case of phyB-ELF3 which promotes light but results in inhibition of warm temperature signalling, and COP1-PIF4, which has the opposite effect. Therefore, better understanding of the crosstalk of these two mechanisms is necessary for the maintenance of ecosystems and the development of warm temperature sustainable and resilient crops. This mini-symposium session aims to bridge the fields of light and warm temperature signalling and give the opportunity to Early Career Researchers to present their research on photobiology and temperature crosstalk, as well as to strengthen and develop fruitful interactions leading to pioneering future discoveries.	Anna Zioutopoulou, University of Glasgow, Anne-Sophie Fiorucci, Université Paris-Saclay, Sreeramaiah N. Gangappa, Indian Institute of Science Education & Research Kolkata, Sourav Datta, Indian Institute of Science Education & Research Bhopal
MINI-SYMPOSIUM Long-distance Signaling in Times of Stress	Plants constantly sense their environment to time active development during the most favorable conditions. During unfavorable conditions, early stress perception is crucial for acclimation, recovery and continuation of normal plant development. Localized stress exposure at a single plant tissue initiates systemic (long-distance) signals that travel to distant parts and prepare the whole plant for the approaching stress. This internal communication system is essential for plant survival in fluctuating and suboptimal environments. Especially now with climate change causing unpredictable weather conditions, it is important to understand and explore such systemic signaling mechanism. This session focuses on environmental changes inducing root-to-shoot or shoot-to-root long distance signaling to modulate plant development. Signals such as ions, calcium, peptides, changes in hydraulic conductance, and hormones have been identified or suggested to be involved in systemic signaling, yet we need to get a better understanding on how these signals induce a response at distant parts of the plant. The complete picture from signal to response will contribute to the understanding of plant stress resilience. Subtopics of this session include 1) root-to-shoot signaling, 2) shoot-to-root signaling, 3) bidirectional signaling, 4) systemic signals, 5) systemic signaling during biotic and abiotic stress, and 6) other stress induced systemic signaling (e.g. neighboring plants, wounding).	Melissa (HACF) Leeggangers, Utrecht University

WORKSHOP- Mobile DNA and Genome Plasticity	Transposable elements (TEs, transposons) are stretches of DNA that can move around the host genomes. Their mobile nature is a double-edge sword because they can be a source of genetic variability critical for adaptive change and can be also a mutagen if they insert in essential genes of the host. Although transposons usually remain quiescent in normal growth condition, they can be strongly activated under stressful conditions such as high temperature and in vitro tissue culture. Of note, tissue culture technique has been adopted as a major means of DNA delivery and genetic engineering of plants, however, the side effects of transposon-imposed genetic instability have gained little attention in the plant science community. It is therefore timely and important to discuss the issues of plant genome plasticity and mobile DNA, particularly in the context of improving crop resilience against climate crisis, by gathering researchers in the relevant science community. It is also worth noting that the field of transposon biology has advanced significantly in the recent years, supported by long-read sequencing technologies, which resolved major technical challenges in investigating TE sequences. Altogether, a workshop on mobile DNA and genome plasticity will not only serve as an academic platform to showcase the cutting-edge knowledge in the field, but also benefit a wider scientific community by providing the opportunities of cross-sector collaboration, which together will strengthen our ability to cope with climate change. Lastly, I would like to confirm that the possible speakers in the workshop were considered for their gender and geographical diversity.	Jungnam Cho, Durham University
MINI-SYMPOSIUM Molecular Mechanisms of Hormone Function	Plant hormones play a crucial role in various aspects of a plant's life. A century of dedicated research, including studies using Arabidopsis as a tool in the past four decades, has yielded a wealth of knowledge in this field. In this session, we aim to highlight recent breakthroughs and explore the new frontiers of hormone functions in Arabidopsis and other model or crop species. The scope encompasses both knowledge and tools to uncover the molecular underpinning of metabolism, transport, signaling, and responses of classic and emerging plant hormones. Topics of discussion will include, but are not limited to, novel insights into hormone metabolism and signaling, spatiotemporal control of hormone function, crosstalk between hormones or with other pathways, technological advancement in hormonal research, and innovative engineering of hormonal pathways for crop improvement.	Liang Song, University of British Columbia
MINI-SYMPOSIUM More than Growth: Plant Development in Plant-Biotic Interactions	Activation of plant immunity due to pathogen or pest attack is often associated with decreased plant growth, a process known as the growth-defense tradeoff. What was originally believed to be a redirection of metabolic resources towards defense and away from growth, is now known to be more complex. Recent research has demonstrated that growth and defense can be uncoupled, indicating that metabolic regulation is not solely responsible for the growth-defense tradeoff, and that developmental and immune pathways intercept. Similarly, successful pathogen and pests can change plant growth and development during colonization, rewiring plant metabolism and plant developmental programs. In this mini symposium we will discuss the molecular mechanisms regulating plant development in biotic interactions. We welcome abstract submissions that deal with how plants regulate plant growth and development during immunity activation, as well as how pathogens and pests subvert plant growth and development for their own benefit. This topic is of great importance for the engineering of plants that combine increased resistance to pathogens and pests with agronomical traits that result in enhancement of plant yield.	Cris Argueso, Colorado State University

WORKSHOP-MONDAY New Methods to Accelerate Plant Synthetic Biology	Foundational work in Arabidopsis has introduced us to the molecular pathways that govern plants' abilities to respond to and adapt to their ever-changing environments. Today, high throughput and synthetic biology approaches allow us to dive deep into the mechanisms that govern the molecular functions essential to plant traits. In this way, synthetic biology can be applied to boost environmental sustainability and security in the food and energy industries. Plants are the most abundant renewable resource on our planet and supply natural products for therapeutic applications, most of the nutrients for human and animal diets, materials for construction, advanced biofuels and bioproducts. Following a decade of bioeconomy investments and synthetic biology roadmaps in other countries, the White House recently announced an ambitious National Biotechnology and Biomanufacturing Initiative that will accelerate and broaden participation in manufacturing innovation, education, and collaboration. This $2 billion spending plan will catalyze recent advances in synthetic biology and will reinforce the research and development of a wide range of plant-based products. This workshop will center on synthetic biology methods such as ancestral sequence reconstruction, developing novel plant tools using surrogate hosts, and characterization of CRISPR mutants in planta.	Roman Ramos Baez, University of Chicago, Catalin Voiniciuc, University of Florida
MINI-SYMPOSIUM Phenotypic Plasticity in Arabidopsis thaliana - Mechanisms and Evolution	Plants have colonised almost every habitat on earth and are the dominant kingdom of life by biomass. A major feature underpinning this success is the remarkable ability of plants to adjust their growth and development to different environments. The ability of a given genotype to generate different phenotypes in different environments is termed phenotypic plasticity. Plasticity is a universal feature of life, and understanding its molecular basis and evolution is a fundamental goal in biology, with major implications for predicting plant responses to a changing climate and for accelerating plant breeding tailored to specific environments. Genotypes can differ in their plastic responses to the same environmental cue, and natural populations often harbor genetic variation in the extent of plasticity on which selection can act. Thus, plasticity of a focal trait to an environmental cue is itself a heritable trait. Variation in plasticity can be captured as genotype-by-environment (GxE) interactions in quantitative-genetic models or as variation in the shape of reaction norms. However, despite the pervasiveness of GxE interactions, their genetic and molecular bases have long been unclear. At the same time, research in Arabidopsis thaliana has elucidated the environmental response pathways to a number of cues in great detail. Building on this knowledge it is now the time to ask where in the underlying molecular networks natural populations harbor genetic variation that determines variation in phenotypic plasticity and underlies GxE interactions. Recent years have seen a greatly increased interest in understanding the molecular basis of variation in phenotypic plasticity in A. thaliana. This is enabled by ever improving high-throughput phenotyping and by computational modelling. This workshop will showcase recent examples of studies into the molecular basis and evolution of phenotypic plasticity as an important potential mechanism for populations to adapt to a changing environment.	Michael Lenhard, University of Potsdam
MINI-SYMPOSIUM Pushing the Boundaries of Single-cell omics Technologies and Applications	Plant biologists have long focused on tissues and organs, but it has become increasingly clear that significant biological insights are lost when overlooking the individual cell, the foundational unit of life. Defining how individual cells function and work together in the context of a complex cellular environment has become the next frontier for biological research. This mini-symposium is therefore dedicated to the latest applications of single-cell omics technologies to plants. Talks will encompass single-nuclei and single-cell RNA sequencing methodologies as well as new developments in single-cell proteomics, metabolomics, and multi-	Rachel Shahan, Duke University, Trevor Nolan, Duke University, Sixue Chen, University of Mississippi

	omics. These technologies are pivotal for uncovering the unique insights hidden within individual cells that can facilitate improvements in crop yield and resilience. We will also explore how single-cell omics, spatial transcriptomics, and live imaging provide a window into the transcriptional heterogeneity of cell populations, their developmental states, and dynamic responses. To increase the accessibility of single cell omics, the session will highlight computational methods and technological innovations that enhance the resolution and affordability of these techniques. A central goal is to equip the ICAR community with the tools and knowledge to lead the frontier of single-cell omics research, enabling applications of these techniques to address important biological questions through iterative hypothesis generation and testing. The session will be approachable for both new and experienced users of single cell techniques with an overall goal to maintain the Arabidopsis community's leadership in new technology platforms and inspire a new wave of research in Arabidopsis and plant biology.	
MINI-SYMPOSIUM Quantitative Proteomics Applications to Dissect Signal Transduction in Arabidopsis	Understanding how plants respond to environmental changes and balance growth and immunity is a critical area of research with significant implications for agriculture. The model plant Arabidopsis thaliana has, and continues, to play a pivotal role in unravelling the complex signalling networks that govern plant adaptation to adverse conditions. Correspondingly, this minisymposium will explore the latest applications of quantitative proteomics in resolving how plants transduce extracellular signals, while also considering how a more wholistic understanding of plant responses may be enhanced by the integration of other 'omic'data-types. The main focus of this mini symposium will be on signal transduction and understanding the mechanisms by which Arabidopsis senses and translates extracellular cues to cellular responses. Topics will include receptor kinases, hormone signaling, and stress-specific cascades, highlighting recent discoveries in the field using a proteomic centric approach. Particular attention will be given to role of posttranslational modifications and the mini symposium will feature discussions on various posttranslational modifications, such as phosphorylation, ubiquitination, and acetylation, and their roles in regulating stress-responsive proteins across the plant cell landscape in Arabidopsis. The mini symposium aims to offer attendees a valuable proteomic platform to fuel knowledge exchange, collaboration, and inspiration for future investigations.	Frank Menke, The Sainsbury Laboratory Norwich, Justin Walley, Iowa State University, Richard Glen Uhrig, University of Alberta
MINI-SYMPOSIUM RNA Modifications and Their Role in Plants	RNA molecules undergo a vast array of chemical post-transcriptional modifications (PTMs) that can affect their structure and interaction properties. It is now clear that this previously overlooked layer of gene regulation has major impacts on plant growth, development, and stress adaptations. Although, N6-methyladenosine (m6A), is the most prevalent and best characterised RNA modification, distribution and biological function of other RNA modifications such as 5-methylcytosine (m5C) and pseudouridine (Ψ) in plants are emerging. While these modifications influence numerous facets of RNA metabolism and functions, their biological implications in plants are still in the early stages of understanding. Recent advances in long read sequencing technology have made it possible to map the RNA modifications at nucleotide level resolution. Leveraging recent advancement in the field of RNA modifications this Mini symposium will seek topics pertinent to RNA modifications, RNA processing and metabolism, mechanisms and role of the RNA modifications in biotic and abiotic stress responses.	Anjil Kumar Srivastava, University of Dundee, Arsheed H. Sheikh, King Abdullah University of Science and Technology (KAUST)
MINI-SYMPOSIUM Robustness and Resilience: Surviving a Changing Climate	Climate change will increasingly have broad impacts on all sectors of society, including the destruction of habitats and reduced access to arable land. Increasing plant resilience will be an integral component in efforts to ensure ecosystem survival and adequate food supply. Key questions for plant scientists include: 1) how will climate change impact plant growth and development at cellular, tissue,	Aman Husbands, University of Pennsylvania, Doris Wagner,

	organismal, and population levels; 2) what mechanisms do plants have to buffer genetic and environmental variability; and 3) how can these mechanisms be deployed to mitigate the negative effects of a warming and more variable climate? This session will feature speakers tackling these fundamental questions from diverse perspectives including developmental robustness, immunity, thermotolerance, and plant invasiveness.	University of Pennsylvania
MINI-SYMPOSIUM Seed Biology: Development, Germination and Dormancy	Seeds provide 70% of global food resources, being the most valuable output from plant production. They also have a critical role in agriculture because the lifecycle of most crops begins from seeds. The development, germination and dormancy properties of seeds are precisely spatiotemporally organised, yet also highly responsive to environmental conditions. The study of seed biology requires a broad-based understanding of physiology, ecology, biochemistry and more. Innovations in single cell biology, 3D imaging and network reconstruction are enabling greater understanding of the different functions of individual cells and tissues within seeds, and how these contribute to seed performance. This symposium proposes to review the most recent discoveries and theoretical advances in seed biology, taking a similarly holistic viewpoint.	Mathew G Lewsey, La Trobe University, Julia Qüesta, CRA Genomica
MINI-SYMPOSIUM Stress Combination: A New Frontier in Plant Sciences	The complexity of environmental conditions encountered by plants in nature, or the field, is gradually increasing due to global warming, climate change, increased levels of pollutants, and/or changes in the population dynamics of different pathogens and pests. While in the past it seemed sufficient to study how plants acclimate to single abiotic or biotic stresses, such as drought, heat, flood, or pathogen infection, the complex conditions developing on our planet necessitate a new approach of studying stress in plants: Acclimation to a combination of two or more stress conditions impacting a plant simultaneously or sequentially (termed, stress combination). Recent studies shed light on the complex interactions that occur between different signaling, molecular, and metabolic pathways triggered in plants during stress combinations. These studies highlight the unique state stress combination imposes on plants and emphasize the need to study stress combination as a new concept in plant biology with a goal of mitigating the effects of our changing climate on agricultural productivity.	Ranjita Sinha, University of Missouri, Columbia, Maria Angeles Pelaez Vico, University of Missouri, Columbia
MINI-SYMPOSIUM Synthesis and Function of Plant Specialized Metabolites that Regulate Development and Stress Responses	Plants produce a diversity of central and specialized metabolites that modulate development and interactions with biotic and abiotic stresses. Many of these metabolites are produced across the plant kingdom and are amenable to study in Arabidopsis with its rich genetic resources, while other metabolites have species-specific synthesis. The synthesis of these metabolites is regulated by complex regulatory mechanisms including transcriptional and post-translational controls that define how much and which metabolites are synthesized. Advances in metabolomics have provided new insight into the diversity of metabolites and unique modifications in responses to changes in the environmental and developmental signals. This session will examine controls of plant metabolism and the function of these molecules in regulating plant growth and development and environmental responses. Applications of specialized metabolites in human health and nutrition will also be considered.	Gloria Muday, Wake Forest University
MINI-SYMPOSIUM The Roles of Biomolecular Condensates and Their Interactions with The Membrane System	Biomolecular condensates are membraneless organelle-like structures that are assembled in response to various developmental and environmental signals through a process known as liquid-liquid phase separation (LLPS). They can concentrate or sequester molecules, particularly proteins and nucleic acids. Biomolecular condensates play key roles in translation, transcription, cell signaling or metabolism. Recent studies have also revealed their close relationship with the membrane system. On one hand, membrane-bound organelles provide a platform to support condensates formation. On the other hand,	Ruixi Li, Southern University of Science and Technology, China, Yansong Miao, Nanyang Technological University, Emilio

	biomolecular condensates exert strong biophysical forces that drive membrane curvature and assist cargo sorting, thereby regulating many basic cell biology processes. In this proposed session, we aim to cover two topics. The first topic will discuss the most novel reports highlighting the condensates phenomena and their roles as regulatory hubs for plant biological processes. The second topic will explore the interplay between membrane system and membraneless condensates, emphasizing its physiological significance.	Gutierrez-Beltran, University of Sevilla
WORKSHOP-REG Tiny Pores With Global Impact	Efficient use of plants is the key to resolve the global climate crisis. However, carbon gain in photosynthesis is a water consuming process as fixing one CO 2 molecule requires hundreds of molecules of H 2 O that are lost via transpiration. As agriculture was primarily developed in regions where water was not a limiting resource, we have been breeding crops with low water use efficiency (WUE) for centuries. However, there is substantial natural variation of WUE among plant species and this holds great potential to improve this trait in crops. In this symposium we will invite speakers to address two pillars of improving plant WUE: (1) how to improve WUE via reduction of transpiration and (2) how to improve CO 2 assimilation in photosynthesis when CO 2 uptake might be reduced. Often, researchers studying these topics are presenting in separate sessions but here we aim to bring recent breakthroughs of WUE and photosynthesis research into same session. We will have speakers covering recent advances showing that manipulation of stomatal development and pore size can improve plant WUE. Reduced CO 2 influx can increase the rate of photorespiration and this can lead to growth penalty. This is particularly important at higher temperatures. We will invite speakers covering recent reports shown how to improve carbon capture efficiency by applying advantages of C4 photosynthesis (and/or C3-C4 intermediates) or through synthetic bypasses to reduce photorespiration.	Toshinori Kinoshita, Nagoya University, Izumi Mori. Okayama University, Hannes Kollist, University of Tartu, Julian I. Schroeder, University of California, San Diego
MINI-SYMPOSIUM Translational Research from Arabidopsis to Crop Plants and Beyond	Research in Arabidopsis has played a significant role in the discovery of genes and pathways, as well as technology development, that have been translated into and applied to crop species and other organisms. In addition, the annotation of plant genomes relies heavily on the gene functions elucidated in Arabidopsis. This session will highlight breakthroughs in Arabidopsis research that have paved the way for fundamental discoveries and technology development in crops and other organisms. We invite abstracts on research that reveal fundamental insights into how discoveries and technologies translate from Arabidopsis to other systems. This session is sponsored by The Plant Cell journal and inspired by the upcoming focus issue “Focus on Translational Research from Arabidopsis to Crop Plants and Beyond”. C. Argueso, A. Roeder and others are editors of this focus issue. Please consult this URL for details, including the submission deadline of 1 August 2024: https://academic.oup.com/plcell/pages/the-plant-cell-call-for-papers	Adrienne Roeder, Cornell University, Cris Argueso, Colorado State University, Joanna Friesner, NAASC
MINI-SYMPOSIUM Visualizing the Dynamics of Cell Biology During Plant Development and Environmental Stresses	Novel imaging approaches and tools are granting researchers unprecedented views of the intricate and beautiful inner workings of plant cells. Direct visualization of in vivo subcellular dynamics in Arabidopsis, from single molecules to organelles, provides new insight into fundamental questions in plant development. Importantly, extending these techniques to environmental stress responses creates novel opportunities to understand and engineer plant resilience. This session will highlight the ways in which technological advances that promote quantitative analyses of subcellular dynamics spur biological insight. Featured technologies will include but are not limited to super-resolution microscopy, advanced electron microscopy, and biosensor development. We hope that highlighting cutting-edge technologies for visualizing cell biology in this	Andrew Muroyama, University of California San Diego, Yue Rui, Stanford University

	session will facilitate the widespread adoption of these techniques among the larger Arabidopsis community.	
WORKSHOP-REG Promociona tu Preprint: Pitch your Preprint	NEED to add	Meenu Singla-Rastogi, Indiana University. Bloomington. Lucia Borniego, Indiana University, Bloomington
WORKSHOP-REG Charting the Course and Weathering Storms: Organizational Practices and Individual Actions that Support Scientists as they Navigate Career Transitions	**Not accepting abstracts:** Career transitions are key points at which scientists, particularly those with marginalized racial, ethnic, gender or other identities, can stumble. A career in science can and should have many intersecting paths, rather than a single hegemonistic pipeline. In this workshop we will provide a set of short presentations about practices that can effectively help people bridge career transitions and persist in science, highlighting organizational practices and individual actions. (1) Assessment of candidates and faculty progress towards tenure. Many organizations strive for a diverse applicant pool and claim to value diversity but use flawed tools and metrics to evaluate candidates or when evaluating progress towards tenure. Search committees should recognize that teaching, outreach, and mentoring are valued scientific pursuits, and that implicit biases can be balanced through predefined assessment criteria and anonymized applications. (2) Fostering a culture of belonging. Many who leave science point to a sense of "not belonging" as contributing to their decision. Diversity, respect, and inclusion, inclusive teaching, and enlightened leadership are key to building a welcoming discipline. (3) Professional societies can provide channels between institutions through which good ideas and systems of support can flow and provide opportunities to change the culture of a discipline, and journals can employ practices to minimize bias in the review process. (4) Perspectives of life outside of academia. Many scientists focus their sights on academia, but industry and government provide ample career opportunities that can be even more rewarding. (5) Secure independent funding and get grants. Grant success begets grant success. Even small awards like travel awards signal your strength to future selection committees. Apply! (6) Find intermural communities. Sometimes you need to step beyond your institution to find support systems. Explore existing affinity groups. (7) Personal advocacy and tips for a successful job hunt. Hear tips for success from early-career researchers who recently found permanent positions.	Mary Williams, ASPB, Mentewab Ayalew, Spelman College
WORKSHOP-REG Our Community Effort to Reannotate the Arabidopsis Genome	**Not accepting abstracts:** The workshop will feature perspectives from participants from the various groups that came together to create an updated A. thaliana reference genome. This version would be the first since Araport11, which was released in June 2016. Whereas all previous versions were produced by teams specifically grant-funded for this purpose, v12 combines the efforts and strengths of independent labs across the world to create a resource for the good of the community. We plan to cover topics from all stages of the reannotation: (1) the brand new community consensus (Col-CC) assembly, (2) the automated gene prediction pipeline, (3) the manual review of individual genes, (4) independent annotations of sets of transposable elements, repeat elements, and lncRNAs, (5) submission and integration into GenBank, and (5) dissemination to resources across the globe. We think this workshop will be appealing to all ICAR attendees because of the wide-ranging impact of the new release on all of plant biology.	Tanya Berardini, The Arabidopsis Information Resource, Nicholas Provart, University of Toronto