CSPB Ragai Ibrahim Award – 2023 Recommendations

Award winner: Mendel Perkins for the work "Monolignol export by diffusion down a polymerization-induced concentration gradient" published in The Plant Cell in February of 2022. The article finally settles a long-standing and important question in plant biology, which is how monolignols are exported across the plasma membrane in order to be polymerized in the plant cell wall. Using a variety of advanced techniques, the authors show that lignin polymerization in the cell wall creates a concentration gradient that drives diffusion of monolignols across the lipid bilayer without protein transporters. The paper establishes a new paradigm in the field and has important implications not just for plant biology, but also for bioenergy and bioproduct applications.

The committee felt that Dr Perkins made tremendous contributions to both the research and writing involved in bringing this project to fruition. We were especially impressed by the wide-ranging and innovative combination of challenging techniques that were used to finally answer this critical question. The deciding factor for the committee was the novelty of the results and the potential impact of the work presented.

Honorable mention: Charles Roussin-Léveillée for the work "Evolutionarily conserved bacterial effectors hijack abscisic acid signaling to induce an aqueous environment in the apoplast" published in Cell Host & Microbe in April 2022. In this work the authors describe a novel mechanism by which pathogens manipulate their plant hosts. Using a combination of transcriptomics, molecular genetics, and metabolite measurements, the authors show that the plant pathogenic bacteria *Pseudomonas syringae* induces host stomatal closure after pathogen entry, to promote high humidity in the leaf apoplast space and favour pathogen replication. The findings presented open the door to the identification of novel strategies to engineer pathogen-resistant plants, including in crop species.

The committee was very impressed by the contributions of Mr. Roussin-Léveillée, who made major intellectual and conceptual contributions to the project and also wrote the manuscript in its entirety. Nearly all of the data for the paper was either generated by Mr. Roussin-Léveillée, or by undergraduate scholars under his direction, which also demonstrated his immense contributions. While the work was done using Arabidopsis, the committee felt that the findings will likely be of interest to the field of plant pathology generally and likely has translational applications.