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THE HEBREW UNIVERSITY OF JERUSALEM

THE SMITH VISION PRIZE

IN AGRICULTURE

AT THE HEBREW UNIVERSITY OF JERUSALEM

2016 תשע"ו

The Robert H. Smith
Faculty of Agriculture, Food and Environment

The Hebrew University's Robert H. Smith Faculty of Agriculture, Food and Environment was founded in 1942. Located in Rehovot, the "Faculta" – as it is known in Hebrew – is Israel's only university-level institution devoted to basic and applied research in agriculture and environmental management. Long counted among the world's top such faculties based on its cutting-edge scientific breakthroughs and successful agricultural outreach, one might expect the Faculty to rest on its laurels – or its long shelf-life tomatoes, advanced irrigation systems, bio-control and soil solarization methods, optimized dairy and fish production, and heat-tolerant chicken breeding. However, inside its busy laboratories, a deep sense of responsibility for meeting challenges confronting mankind has led to a new vision that builds on the Faculty's well-established reputation for agricultural innovation, aiming to address the challenges involved in providing sufficient healthy food for the world's growing population while protecting and sustaining the environment.

The Robert H. Smith Faculty of Agriculture, Food and Environment has long played a pivotal role in the development of technologies and techniques benefiting Israel and the entire region. Students from over 155 countries, including many developing nations, have studied at the Rehovot campus, going on to make a difference in their home countries. Thanks to the vision of Robert H. Smith, this type of interdisciplinary innovation, expert teaching and outreach will not only continue, but will expand in dynamic new ways.

The Robert H. Smith
Vision Prize in Agriculture

The Robert H. Smith Vision Prize in Agriculture was established by David Bruce Smith in memory of his father Robert H. Smith, benefactor, visionary, friend, and namesake of the Faculty of Agriculture, Food and Environment. The Prize is awarded annually to a PhD student whose research best reflects the vision of Robert H. Smith in feeding the world through sustainable agriculture and whose research shows potential for applicability in fields relevant to agriculture, food or environment.

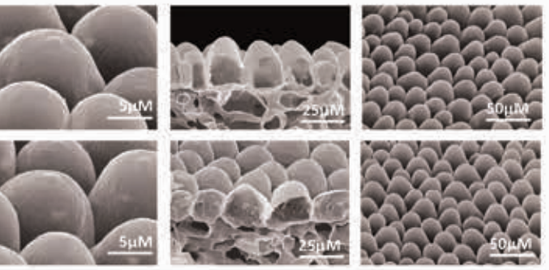
David Bruce Smith

David Bruce Smith, son of Robert H. Smith z"l, is actively engaged in philanthropic leadership on behalf of The Hebrew University of Jerusalem and American Friends of The Hebrew University. Devoted to Israel's well-being, he is a distinguished member of the Smith family of Washington, DC, longtime supporters and Benefactors of The Hebrew University. David Bruce Smith, his sister Michelle, his brother Steven z"l, his parents Robert z"l, and Clarice Smith, and his grandfather Charles Smith z"l, have been dedicated to The Hebrew University and foster many aspects of the University's work. Among other initiatives of vital importance, the family has been a driving force behind the growth of The Robert H. Smith Faculty of Agriculture, Food and Environment.

An AFHU national board member, David Bruce Smith is on the Campaign Committee, The Hebrew University's Board of Governors, is a member of the advisory board of the Mid-Atlantic Region and is President of the National Institute of Psychobiology in Jerusalem.

Alon Cna'ani

Smith Vision Prize in Agriculture, 2016



Alon Cna'ani is a Ph.D. student at the Robert H. Smith Institute of Plant Sciences and Genetics in Agriculture at the Robert H. Smith Faculty of Agriculture, Food and Environment. Raised in Qiryat Tivon in Northern Israel, he completed his military service in the military intelligence at the rank of Lieutenant.

Alon always had a keen interest in nature and plants, and worked for several years in agriculture and farming, specifically in olive cultivation and oil manufacturing. This experience, coupled with his upbringing in a natural and eco-friendly environment, influenced his decision to study plant sciences. He completed a B.Sc. in Plant Sciences at the Robert H. Smith Faculty of Agriculture, Food and Environment, achieving the highest degree of academic excellence for his grades, and is currently in the direct Ph.D. program under the supervision of Prof. Alexander Vainstein.

Alon's research focuses on mechanisms that allow flowers to produce and emit scent compounds, a trait that is essential for sexual reproduction and fruit set. His individual research projects are aimed at finding novel strategies that plants use in order to regulate, or fine-tune, the process of scent emission.

During Alon's time in Prof. Vainstein's lab, he discovered that *Petunia* plants grown at elevated temperature conditions are significantly defected in production and emission of scent compounds. This was found to be linked to arrested expression and activity of proteins that facilitate the biosynthesis of the compounds. He also demonstrated an approach to bypass this adverse effect by expressing the *Arabidopsis thaliana PAP1* gene, which boosts the production of scent regardless of the ambient temperature. It is well known that global warming already negatively affects plant growth in the agricultural context. Taking this into account, Alon's results enable better understanding of the effect of global warming on pollination – largely based on scent as an attracting cue – and devise strategies to overcome the decrease in beneficial volatile production.

In another project, Alon characterized the first gene (called *PH4*) that functions as a direct regulator of scent emission. When he manipulated the expression of this gene to a halt, *Petunia* flowers ceased to emit scent, but continued to produce it. Interestingly, this gene apparently serves as a switch between two crucial floral traits – color and scent.

Currently, Alon is investigating a process called glycosylation, in which flowers conjugate a sugar molecule onto the scent compounds, thus rendering the scent non-volatile. In his research, it appears the level of sugar-bound volatiles fluctuate diurnally and peaks during noon, while the level of free volatiles decreases. His research also reveals that these conjugated volatiles are stored within the vacuole, the largest cellular compartment of plant cells. Alon believes this allows the flower to better regulate the process of scent emission during the day, and also to store the scent compounds for future use, as the adding of sugars promotes the solubility of volatiles within cell compartments. Alon's findings have the potential to lead the way to the generating of hybrids with an enhanced pleasant scent, a benefit for both pollinators and human beings.