

Matching the expertise of perfumers to create new scents

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From jasmine to sandalwood, the alluring scents of the most luxurious perfumes might seem more art than science, but a new way to analyze them breaks from the tradition of relying only on experts' sense of smell to blend fragrances. Scientists report that they have developed a model that can help perfumers predict how various combinations of chemicals will smell. The study appears in the ACS journal *Industrial & Engineering Chemistry Research*.

Miguel A. Teixeira and colleagues from LSRE laboratory in Portugal explain that the design of new [fragrances](#) for the perfume industry still relies on a trial-and-error process, which requires time and some raw materials that are in short supply. And although expert perfumers have famously well-trained noses, they are still affected by biases, such as personal experience and social habits. Sometimes they disagree on the nuances of a given fragrance, which can be complex, depending on the number of ingredients and how they interact with each other. Teixeira's team wanted to see if they could quantify what the nose knows and use science to bolster the [art](#) of the fragrance industry.

They developed and validated a model called the Perfumery Radar 2.0, an updated version of a previous model they created. They used it to classify perfumes into families, such as floral, citrus or musk, but also to identify their nuances, such as spicy or sweet, fresh or warm. When compared to how perfumers categorized the fragrances tested, their "radar" closely matched how the experts described them, without subjective biases. The researchers say that it will be a "valuable tool for

the pre-formulation stages of fragrance design and classification, thus helping perfumers" create new scents.

More information: "The Perfumery Radar 2.0: A Step Towards Fragrance Design and Classification" *Ind. Eng. Chem. Res.*, Just Accepted Manuscript. [DOI: 10.1021/ie403968w](https://doi.org/10.1021/ie403968w)

Abstract

Product design & engineering is one of the novel paradigms of the 21st century, aiming for the development of novel added-value products for consumers. Its application to the fragrance business for the purpose of enhancing the design and performance of perfumed products is of prime interest because nowadays three-quarters of consumer goods contain fragrances in their composition. Furthermore, fragrance design and classification is still performed on a trial-and-error basis which consequently increases products' time to market and consumption of raw materials. The Perfumery Radar methodology was developed in the recent past as a tool for fragrance design and classification with predictive capabilities. In this study, we extend it to the Perfumery Radar 2.0 which uses typical olfactory families used by the industry but also introduces outer and inner layers for a detailed description of the odor space of fine fragrances. Furthermore, we fully validated this methodology with sensorial classifications of perfumers using several formulated fragrances with known compositions and physicochemical properties with very good predictive accuracy. Finally, and for the first time, we applied the Perfumery Radar 2.0 to 36 commercial fragrances differing in gender (feminine, masculine and unisex) and covering the odor space. Correlations between olfactory families or odor descriptors with gender trends as well as with richer olfactory families like chypre and fougère were also derived.

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