

Ari intro: This is Small Matters – the audio series where we sweat the little things. I’m Ari Daniel.

Just outside of Atlanta, there’s a special little place called the Kimball House.

Wall: Our first goal as chefs is to nourish people.

Ari: Jeffrey Wall is the co-executive chef at the restaurant. The other chef is his friend, Philip Meeker.

Meeker: And it’s about presenting something new, a new experience.

Ari: That new experience involves the freshest and most local of ingredients, the use of modernist techniques – more on that in a moment, and partnering up with this guy, Justin Gallivan.

Gallivan: I am a card-carrying chemist at Emory University. This is like an arranged marriage that seems to have worked very well!

Ari: Gallivan’s also a pretty good amateur chef, and he’s gotten into using things from his chemistry lab in the kitchen. Which just thrills the two chefs at Kimball House. For instance, when Gallivan entered the restaurant kitchen that evening, he came bearing gifts. He’d taken ground up toasted pecans, and run them through his centrifuge.

Gallivan: This was spun at about 10,000 times the force of gravity. And what that does is it basically moves the heavy stuff to the bottom.

Ari: And the lighter stuff moves to the top.

Gallivan: So you start getting a separation. And on the top, you can actually see this nut cream.

Wall: Oh my God, this is insane.

Ari: A middle layer is pure pecan oil.

Gallivan: Smells like a pecan pie. Take a sniff of that.

Meeker: Oh, my God.

Ari: The chefs instantly assimilate the new taste into their flavor repertoire, and incorporate it into the salad course. I should say that the term “salad” is used rather loosely around here.

Meeker: Think Monet – the beautiful lily-like paintings.

Ari: Philip Meeker wants to make the salad look like a pond. Juiced vegetables –

Meeker: Romaine, celery, fennel.

Ari: – form the green pond water. Nasturtium leaves have become mini lily pads. And it's finished off with a couple drops of Gallivan's pecan oil. The result really does look like a pond on my plate. Gallivan is grinning.

Gallivan: I just got a bit of the pecan oil, and it's just fantastic. It's just bursting with pecan flavor.

Ari: Chef Jeffrey Wall is just as pleased.

Wall: To be able to execute clean flavors like this that are so concentrated is what everybody wants in the culinary world.

Ari tape: What does chemistry have to do with cooking?

Wall: I think everything. Cooking is a constant battle with learning how food works. And food is chemistry.

Ari: Case in point – the final dish in our seven-course meal.

Meeker: This is the duck that we fed figs and almonds to make them nice and flavorful and fat.

Wall: Feeding ducks figs is a 4000-year-old technique.

Ari: Meeker and Wall worked up the duck in four different ways. First, a roulade made by rolling up the breast inside the skin, and searing it to caramelize the exterior. Chemist Justin Gallivan.

Gallivan: Caramelization is basically heating sugars to very, very high temperatures. There's also browning reactions, that are collectively known as the Maillard reaction, that are also associated with producing flavors and some of the colors.

Ari: The second preparation is a duck mousse made from pureeing the legs and tenderloins with crème fraîche and a touch of nutmeg.

Gallivan: We're just transforming matter from one state into another, whether it's transforming molecules from A to B or transforming this duck to some remarkable dish, it's all chemistry.

Ari: Third, a homemade ravioli made from ricotta, bok choy, and duck leg confit. That confit was cooked using a modernist technique called sous-vide.

Gallivan: So sous-vide is a process in which food is cooked in a water bath to a very precise temperature, and you let it sit, and it will equilibrate, and it cannot overcook.

Ari: And the final preparation –

Wall: The pastrami that we made. And then put it on some toast with some fig jam and almonds. Full circle, you know, we wanted it to eat figs and almonds, and then we wanted to serve it with figs and almonds. And we had high-tech equipment to cook all this at perfect temperatures and then – yet it's a 4000-year-old technique. So enjoy.

Ari: The preparations of duck are displayed on a long dish, each one a swirl of form, color, and aroma. What's happening in this kitchen is a deep blend of science and art. Chef Philip Meeker.

Meeker: We try to take many different viewpoints. We think about maybe a song, and we think about these flavors' parallels to notes. Or we'll think about a nice poem by Ezra Pound. It's always good to find inspiration everywhere, and to have your mind open.

Ari: In finding inspiration in music, poetry, and chemistry – the result at Kimball House is unforgettable.

Ari tape: Like, literally, this is probably the best meal of my life.

<applause, and fade up music>

Our series, Small Matters, is produced by the Center for Chemical Evolution, and sponsored by the National Science Foundation, with additional support from NASA. I'm Ari Daniel.