

Thought Leaders

SCIENCE



Science Queen

Saint Mary's College professor Sonya Schuh's cutting-edge research tracks the hidden toxins in everyday consumer goods.

BY LINDA LENHOFF

In the summer of 2020, Saint Mary's College associate professor of biology Sonya Schuh got an email from a film production company inquiring about her research. "I kind of didn't believe it, and I was busy," she recalls with a laugh. She soon checked out the company, and found Jane Doe Films was for real—and creating very interesting, award-winning work. One thing led to another, and Schuh and her all-women team of six student researchers at Saint Mary's ended up being featured in the 2022 HBO series *Not So Pretty*, which explores the hidden toxins in cosmetics.

"They filmed us in the lab at Saint Mary's during our Summer Research Program," Schuh says. *Not So Pretty's* Academy Award-nominated directors documented the students investigating endocrine-disrupting bisphenols (such as BPA) and other hazardous chemicals found in

common products. Schuh and her students appear throughout the third episode, called "Skin," revealing the ugly facts about BPA alternatives and phthalates in cosmetics being hidden by the multibillion-dollar industry.

"I'm really interested in looking at the effects of toxic or potentially toxic chemicals that are used in all kinds of consumer products, from plastics to cosmetics to personal-care products, hair products, and more," Schuh says. "Almost anything with fragrance in it—cologne, perfumes, body wash, even trash bags, believe it or not. All of those consumer products have various chemicals in them, some of which we know have harmful effects on development, reproduction, fertility, and overall health for males and females."

BPA and phthalates are used as additives or solvents to increase durability or flexibility.

"Unfortunately, [BPA hijacks] the body's hormone system and wreaks all kinds of havoc on normal physiology," Schuh says. "Studies have found that these chemicals in plastics leach into food, water, and various personal-care products, and negatively impact our bodies, mimicking or blocking the effects of estrogen and testosterone."

BPA has gotten plenty of bad press in recent years—so much so that major companies now advertise BPA-free goods, though the alternatives they use are not regulated. And are those options any better?

"You don't have to be a chemist to look at the chemicals and see how similar they are to the original BPA," Schuh says. "It's like

From top: Sonya Schuh; the professor and her student researchers in a lab at Saint Mary's College.



FROM TOP: HALEY NELSON/COURTESY OF SAINT MARY'S COLLEGE OF CALIFORNIA; FRANCIS TATEM/COURTESY OF SAINT MARY'S COLLEGE OF CALIFORNIA (2)



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different Legos. They just have different colors and a couple of extra prongs, but pretty much a Lego is a Lego, and they still click in where they can normally fit."

Schuh and her students began looking at replacement chemicals like BPAF, BPS, and the newest one used in coatings by Sherwin-Williams, TMBPF, as well as some phthalates. They studied them side by side, comparing the effects of the replacements with the effects of the parent compound.

"Right away, we found that for most of those replacement chemicals, their effects are actually way worse," Schuh says. "They're more potent, more toxic, and [cause] more birth defects. So that labeling is really just a marketing tactic."

Phthalates are another group of endocrine-disrupting chemicals that help hold in fragrance or add flexibility and softness—and dangers. Much of our exposure to these chemicals comes through ingestion (from plastic leaching into foods and drinks from thermal container liners, for example), but "a lot of it is also through the skin, transferable through the fingers, the face, the scalp," Schuh adds.

And then there's the crux of the matter for Schuh: "A lot of those products are female-focused," she says. "Piece by piece, we're looking at these BPA replacements and various phthalates, and then also looking at the most commonly used ones."

To see how this research impacts you, check your bathroom drawer. "Many of these chemicals are in things like nail polish, cosmetics, [and] body and hair products—both the products themselves and the packaging," Schuh says.

Schuh and her researchers examine the chemicals starting at low exposure levels, mimicking what people encounter daily. "We are seeing all kinds of bizarre things over and over again ... with low doses of the same chemicals that are in plastics, beauty products, and fragrances," she says.

So does that mean you should toss your signature perfume or favorite eyeliner? Schuh offers the following advice: "Start by being a smarter consumer, avoiding plastics, looking carefully at ingredients, avoiding things that have a lot of fragrance. Consider choosing one or two you really like, to cut down exposure."

Several apps and websites also help shoppers check their brands to see just what hides behind the ingredients—those shown and not. Check out Think Dirty, INCI Beauty, Yuka, and the Environmental Working Group's Skin Deep site.

Beyond her cutting-edge research, Schuh is committed to advancing women working in STEM. "I want to make an impact and



a difference on human beings' lives and can do that directly by teaching my students, training them, mentoring them—especially women in STEM who are going to go off and pave roads and break barriers.”

Schuh says she loves being able to make future “science queens.” Many of her former students—both men and women—have gone on to top graduate and medical schools around the country.

Research and teaching keep Schuh busy, but she also values time for her three kids, the rest of her family, and self-care. “I’m very grateful and blessed in so many ways, and I do make sure that I guard that time,” says the Danville resident. She loves the East Bay’s hiking spots and water activities, like kayaking and swimming.

Schuh is also a dancer and artist. She creates jewelry and photography, making art “even in the images that we take of cells. I teach my students how to make them beautiful and artful, because when people see them, it draws their attention. I use my art and my science all the time.”

Increasing recognition of these harmful products is another important draw on Schuh’s attention. “I want to get this work out into the public, to the nonscience person, beyond just my fellow nerds, because the more awareness we have, the more changes can happen with policy-makers, innovators, and manufacturing companies,” she says. “When it comes to plastics, cosmetics, personal-care products, all interrelated industries, there’s very little regulation in the U.S.”

Next up? Hopefully, a big grant. “We want to chemically analyze the exact components of all different types of cosmetics, body products, plastic packaging, and food and water containers—a lot of the standard consumer products and even the ones claiming to be BPA- and phthalate-free. We want to look at the products that we use as humans and see what’s actually in them and at what levels. The results may not be pleasing to big companies, but they will be eye-opening,” Schuh says. ■

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