(Not) According to Custom

New Options for Putting the 'I' in Eyewear

BY CATHERINE WOLINSKI/CONTRIBUTING EDITOR

For many consumers, the term "custom-made" evokes images of an old world tailor or wooden last-wielding shoe cobbler. These days, though, most shoppers get their clothing and accessories from a combination of mass-market retailers, national and regional chain stores, or even small and independent boutiques, of which most don't carry items that are fit to our exact contours.

According to retail experts, however, a rising tide of modern shoppers are receptive to made-to-order products that are more personal, more comfortable and more distinctive—in a word, customized. Some even seek products that go beyond customization—modifying an existing product to suit the customer's needs—and are truly individualized, one-of-a kind creations.

Within the optical industry as well as many others, a growing list of retailers, technology firms and designers are responding to this opportunity by developing new tools and techniques that enable them to reach individual consumers and provide the unique experiences they seek. Frame and lens suppliers have long offered customization options—and many are still freshening those ideas. But digital capabilities and technologies are fueling new versions of the trend and creating new possibilities for consumers that include the fitting, try on, ordering and service aspects of the eyewear buying process.

In a report published by the global business consulting firm, Bain & Company, "Making It Personal: Rules for Success in Product Customization," authors Elizabeth Spaulding and Christopher Perry identified a key benefit of customization: increased loyalty.

The 2013 report, based on studies Bain conducted including a survey of more than 1,000 online shoppers, found that 25 percent to 30 percent of shoppers surveyed were interested in trying a customized product; that customers who had purchased a customized product online engaged more with the companies they purchased them from, both visiting their websites more frequently and staying on web pages longer; and that customers are willing to pay 20 percent more for customized products.

Another Bain study referred to in the report, which surveyed more than 1,200 global executives across a range of industries, found that 67 percent of executives believe their customers are becoming less loyal to their brand.

At a time when brands are feeling that their customers are fickle (or at the very least, that retail trends are faster-moving and more unpredictable than ever), a company's ability to customize products can help them connect with hard-to-reach consumers, particularly the oft-scapegoated Millennials.

As Spaulding and Perry summarized, "as a growing consumer force, young shoppers demand more individualized products than their older counterparts—they're not a one-size-fits-all generation."

Forbes magazine identified customization as a growing trend in a particular industry: eyewear. The article, "Custom Eyewear: The Next Focal Point For 3D

Printing" highlighted Tom Davies, a London-based designer and founder of TD Tom Davies and Tom Davies Bespoke Opticians who *Forbes* said had been experimenting with 3D printed eyewear since the early 2000s; Protos, which was (and still is) in its crowdfunding phase; and Mykita, which had pioneered the use of Selective Laser Sintering, or SLS technology, to manufacture the Mykita Mylon collection.

Though their approaches range from Davies' bespoke "prefit" frame designs to Mykita's coined "manufactory" products, all three brands were early adopters of a trend that is still emerging: 3D printed eyewear.

The potential benefits of 3D printers in the eyewear industry are many, including, but not limited to, frame prototypes and production that is faster, cheaper and incorporates new materials that are lighter, durable and sometimes environmentally friendly.

One company that exemplifies these benefits is the Italian Thema, a family factory that recently opened its first U.S. facility in Miami, and which makes and distributes eyewear brands including iGreen Eyewear, Giorgio Valmassoi 1971 and Philosopheyes.

"The digital evolution that has been happening in the past [few] years has brought to the market new consumers, new technology, and new opportunities," said Thema's North American director, Giulia Valmassoi. "These are the reasons why we decided to introduce the iGreen Custom Collection, where the patient gets to be the designer, and they can do it either with the help of a professional or sitting comfortably at home."

Jay Engelmayer, vice president of digital development and strategy for pq Eyewear, shared similar sentiments about pq by Ron Arad, which has been testing its on-site digital scanning system and SLS technology to provide custom-made 3D-printed eyewear to tech- and design-savvy workers at several WeWork locations in New York and Boston.

Engelmayer said, "We're changing the industry in the sense that every [frame] manufacturer prints out thousands of frames, and if they don't sell, most are destroyed. For the optician, especially the independent who has to purchase frames not knowing if they'll be able to sell them, [instead of] having five, six or 7,000 frames in stock, you have one model of each, an iPad, and a computer, and the customer can customize whatever color or shape they want."

Customization and personalization have also been occurring on the lens side of the business for several years, gaining momentum in the early 2000s with the introduction of free-form lens processing, a digital manufacturing process that uses computer-aided design and surfacing to create customized eyeglass lenses designed to fit a patient's specific prescription and frames. [See sidebar on page 38]

The technology, developed by several lens companies in conjunction with equipment makers and software companies, calculates a prescription that combines refractive data with the patient's biometric data based on the position of wear measurements to produce lenses that are customized for each individual wearer.

Together, these relatively new and multidimensional measuring and manufacturing devices are changing the way companies make frames and lenses, the way optical retailers carry and dispense them, and the ways consumers select and buy them.

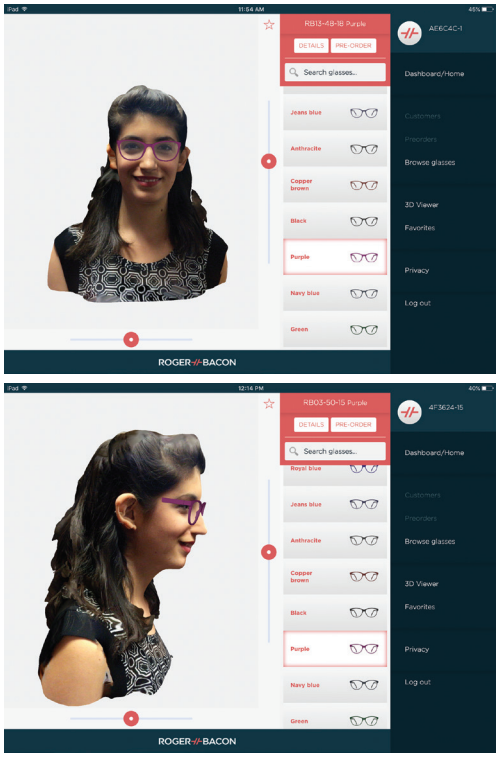
Wherever you stand on the tech-savvy spectrum, consider this a window to the 3D revolution, from the mass-customizable to the truly one-of-a-kind.

Here are some of the major players in today's market offering customized eyewear options in an effort to reach individual consumers and provide the unique experiences they seek.

Eyenavision: Roger Bacon Eyewear

Eyenavision, an eyewear accessory development company known for its custom made Chemistrie lenses and lens layers, changed the eyewear customization game when it became the exclusive distributor of Roger Bacon Eyewear, a Netherlands-based company which developed a made-to-measure 3D printed eyewear collection available for sale through independent retailers.

In fact, Eyenavision CEO, Joe Zewe described Roger Bacon as "a complete paradigm shift for the optician."



Eyenavision's Roger Bacon Eyewear developed a proprietary scanning system that precisely measures patients' facial dimensions, providing a 360-degree virtual try-on experience.

Roger Bacon developed a proprietary system that uses a biometric scanner attached to an iPad to provide precise measurements of patients' facial dimensions. The scan is uploaded into a cloud-based Roger Bacon app, and a file is transferred back to the ECP's iPad as a 360-degree rendering, so the customer can see themselves wearing different frames in an enhanced, virtual try-on experience.

ECPs are provided with a scanner and visualization unit on which patients are able to preview any frame

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Mixing and Matching Colors, Shapes and Sizes

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in the Roger Bacon Eyewear collection, which includes 20 different frame shapes in 10 different colors, with more on the way, Zewe said.

Once the frame shape and color are selected, orders can be placed directly from the iPad via Roger Bacon's cloud-based ordering system. Frames are custom printed, sent to Eyenavision for final inspection and assembly, and sent to the ECP—complete with the customer's name engraved in the temples—in about three weeks' time.

New frame models appear in the app automatically, ECPs can purchase samples within the app, and every six months, a Roger Bacon rep will swap out samples so the most up-to-date frames are in the store.

And, when the visualization unit is not in use for a patient, it can display advertisements of the ECP's choosing.

"The benefit for ECPs is that they can offer multiple colors, but don't have to stock every frame in every color," Zewe told *Vision Monday*. "They only have to carry a few samples, and don't have to worry about being out of stock. All of the styles are accessible through the app."

Further, Zewe explained, "Patients can try on every frame in the collection...It completely changes the patient experience. They're more engaged and involved in the selection."

Roger Bacon is currently sold at about a dozen retailers in the U.S. and more than 30 in Europe, Zewe said.

Future developments for Roger Bacon include social media shareability, the ability to mix colors, and the ability to use more materials, such as a hybrid plastic-metal frame, according to Zewe.

Thema: iGreen Custom

Thema's iGreen Custom collection offers the consumer "the opportunity to design his or her very own eyewear, something which belongs to them alone, while showcasing their personal taste and fashion sense," said Giulia Valmassoi, North American director at Thema.

Consumers use an online tool, the iGreen 3D Configurator, to create a customized frame. Using the iGreen 3D Configurator, the customer chooses from

The iGreen 3D Configurator allows ECPs and customers to view thousands of frame options, with 30 styles in three sizes and 400 color options available online.

an array of frame shapes, which currently include 30 styles in three eye sizes and 400 colors, along with interchangeable temples. This alleviates the need for optical dispensers to stock every frame in a collection

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The Original 'Customizable' Eyewear: Rimless Stays Timeless

Rimless or three-piece mounted eyewear dates back as far as the early 19th century, when pince-nez and simple shapes offered new options for people needing vision correction. They evolved further in the early 20th century and into the '40s and '50s to reflect a range of lens shapes and, traditionally, refined metal frame and bridge treatments.

As new eyewear trends took on a designer fashion influence, rimless evolved again in the late '80s and early '90s, featuring more modern interpretations of shapes, including faceted eyewear and tinted lenses, when customization flourished again.

The early 2000s saw a renewal of interest throughout the market in three-piece when dozens

Silhouette's new "shop in shop" in-store merchandising conveys the customization story.

of companies offered rimless when the global market was still embracing tooled retro metal frames and starting to move toward new plastics.

With the introduction of the iconic Titan Minimal Art in 1999, Silhouette debuted a modern interpretation of the three-piece trend.

Today, Silhouette stresses the "choice" message, noting, "Silhouette's mission has been to craft uniquely customizable eyewear to perfectly fit the individual who wears it. With features, personality as well as style in mind, Silhouette offers a full lineup of sizes, colors, shapes and styles to suit the simply classic to the boldly fashionable. ■

—Marge Axelrad

To Create the Perfect Fit, Plan to Scan

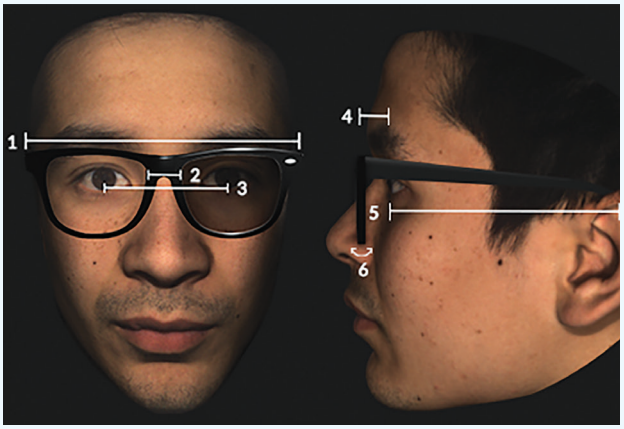
Fuel3D made its ophthalmic debut when it partnered with Sfered, an eyewear technology developer, to create the 3D Mirror Scanner, the first 3D scanner to be incorporated into a mirror to support the deployment and fitting of custom eyewear. The system was first introduced at Silmo last year in collaboration with monoqool, an eyewear designer which pioneered 3D laser printed polyamide frames that are customized to wearers.

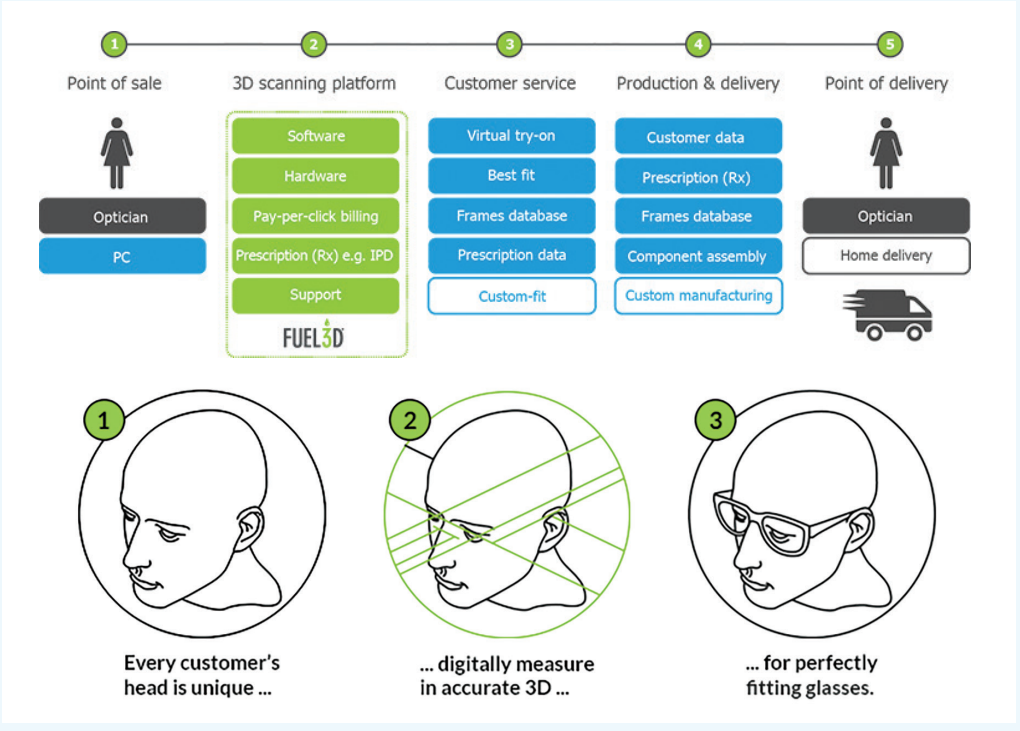
Fuel3D later collaborated with FittingBox, a company that develops virtual try-on solutions for eyewear, with a product called the OWIZ Mirror. Fuel3D developed a 3D scanning enhancement for the OWIZ system which allows optometrists and opticians to offer customers a unique in-store experience, in which they can rapidly change between frame styles and view themselves in new frames in real time. By tracking their head movements, the program provides customers with an augmented reality experience that shows how they will look in different frames via on-screen video.

With Fuel3D's highly accurate facial scanning technology, opticians are able to collect all metrics required to fit and produce custom fit eyewear in a single scan. The high-speed 3D capture collects facial data including pupillary distance; nose bridge width; facial width; and distance to the ear in just 0.1 seconds.

Fuel3D's partnerships with eyewear technology companies will offer opticians access to a wide range of frame data, allowing them to virtually fit customers to many more frames than would typically be available in-store.

"Eyewear is one of those retail experiences that is going to benefit from customization," said Fuel3D CEO, Stuart Mead. "This is where opticians can participate in the next industrial, revolution rather than seeing it as a threat."





Fuel3D's high-speed 3D capturing has applications in many industries, including eyewear.

Fuel3D plans to preview a new platform, the 2SEVENTY Scanner, at International Vision Expo East next month. The company also held private demonstrations of a new 360 degree scanner at CES in January; commercial availability is expected for June, 2017. ■

Making a Fashion Statement, One Frame at a Time

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since they have access to collections in an online service. Each frame is handmade in the Thema optical factory and shipped directly to the ECP in about three weeks.

"That's several thousand possibilities that an optician can order for a customer with zero inventory," said Valmassoi. "For the optician, it's great, because every time they order a custom frame, they're ordering something they've already sold."

Although iGreen recently became available online, optical retailers interested in carrying the iGreen Custom collection have two display options, Valmassoi said. For those "more in love with the digital revolution," she said, a 3D Configurator which shows all the different shapes in the customization program is provided in a free-standing display with 100 color chips shaped like frame fronts in half shiny, half matte (there are 400 colors in total).

For space-strapped ECPs, an iGreen Custom Box is provided that can stand on a countertop and store samples in drawers. In February, Thema will debut the first iGreen Sunglass collection with five new styles.

pq by Ron Arad

Ron Arad, a designer who is "eclectic but well known in Europe and Israel," according to pq Eyewear's Engelmayer, wanted to create something completely different.

Since 2000, Engelmayer said, Arad had been experimenting with 3D Systems at his studio in London, where he learned that 3D printing allowed possibilities for eyewear not possible on the production line. He also learned its limitations, like that traditional hinges can't be 3D printed, which led to the D Frame design, a hinge-free solid frame.

Arad uses SLS technology to create frames that are "strong enough to carry weight and be durable, and are also lightweight," said Engelmayer.

At press time, 16 styles of pq by Ron Arad were

pq Eyewear tested its customization concept at 10 WeWork locations in New York and two in Boston.

available, with eight more on the horizon. Once a customer's face is scanned and they select a frame style, the frame order is sent directly to London, where it prints in a few hours. Then it is sent to a finishing facility in Italy for its color, glaze and packaging before being sent directly to the consumer.

To date, about 2,000 pairs of pq eyewear have been shipped to customers. Though pq does not pin down a specific audience, the frames, whose styles "on the one hand look beautiful, and on the other hand look kind of space age-y," Engelmayer said, are well suited for educated, tech-savvy adults who care about their eyewear.

Engelmayer also told *VM* that pq expects to open its first store and begin collaborating with opticians in New York by May or June 2017. Though specific retailers could not be identified at press time, he said pq plans to partner with independent opticians.

Luxottica: Ray-Ban Remix

Ray-Ban has been offering its Remix collection as a way for consumers to customize the classic Ray-Ban choices.

Online and in-store, Ray-Ban Remix offers customized eyewear that's fast, fun and for the young, if their branding language is any indication. Using the motto, "do you," Ray-Ban Remix allows customers to sign in online and select their desired model, colorway, material and lens type, with the opportunity to "keep it real" at each stage.

Ray-Ban Remix offers 17 style options, including the Ray-Ban Aviator, Wayfarer and select Light-Ray Generation models; 250 color variations; and 90 lens options, from their mirrored and colored flash lenses to the green G15, developed, at first, for military use.

The most "customization" comes in at the engraving stages, during which Remix buyers can include a written message on either side of their sunglass temples with up to 10 characters—this, Ray-Ban said, is where customers can "name their bae" or "keep it real with

Ray-Ban Remix offers customization at every step, from the frame shape and color to the lens type and engraving opportunities.

that lyric," or even include certain emojis (heart, smiley face, sun or eighth notes). For the sunglass case, 36 characters can be engraved over two lines.

Once sunglass frames are assembled and lenses mounted at the Ray-Ban factory in Italy, a registration

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Enhancing Craftsmanship With New Technologies

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check matches each frame to its blueprint, giving the Remix manufacturing team an opportunity to make any adjustments. The sunglasses are then delivered to the customer's home in less than a week, arriving in four days for European orders and five days for purchases made in the U.S. For those outside Europe and the U.S., delivery can take up to 10 days.

Wesley Knight

Wesley Knight, a bespoke eyewear designer who makes individually handmade water buffalo horn frames in his workshop in Franklin, Tennessee, said his education in the liberal arts, affinity for old English tailors and shoemakers, and an innate interest in design led him to start his own company in 2013.

Knight's approach to personalization is both antiquated and modern, combining 19th-century tools like a scrawl, an assortment of pliers and hand files, and a basic jeweler's bench, with 21st century tools like an iPad and FaceTime to photograph and communicate with clients over the course of his six- to eight-month custom frame-making process.

"We rely heavily on the oldest technology, our hands and our eyes, and communication with our clients," said Knight, who insists he is "not a luddite. What we're offering is a more artistic frame that's very carefully made with our hands and with very basic equipment." That being said, he continued, "Wherever we can incorporate technology that helps design, we will."

Knight, who works with his wife and one apprentice, describes his frame making as a "relational building process" dependent, first and foremost, on meeting each client in person, which he requires for his custom designs. Each frame is sketched, cut and polished by hand, and Knight works with an area optician to fit frames with lenses.

Despite his devotion to handmade, individual pieces, Wesley Knight plans to debut an e-commerce store with ready-to-wear models in the near future, first with a sunglass line and then with ophthalmic styles.

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For Wesley Knight, "custom" eyewear means each frame is handmade using basic tools in his Franklin, Tennessee workshop.

Lenses Lead the Way to Personalization and Customization

The first step toward creating personalized eyewear occurred in the early 2000s, when digital and free-form spectacle lenses hit the market. Among the first to market were Zeiss, Rodenstock, Seiko, Shamir, Hoya and Essilor.

Using digital surface generators powered by free-form technology developed by companies such as Schneider Optical Machines, Satisloh and Opto-Tech, and advanced lens calculation software from DVI, VisionStar, CC Systems and others, the lens makers created sophisticated new ways of shaping both the front and back lens surfaces. The resulting lens designs allow new opportunities for wearers and opticians alike.

There are three main sub-categories of digital and free-form progressives (PALs): optimized, customized and personalized, often referred to as good, better and best.

(Good) Optimized—An optimized digital lens employs proprietary software, combined with CNC lathes to customize thousands of points across the lens surface using default fitting data. Required fitting measurements: monocular PDs and segment heights.

(Better)—Customized PALs incorporate all the benefits delivered by the optimized design, with additional enhancements using actual measured Position of Wear (POW) data. Required fitting measurements: monocular PDs, segment heights, lens tilt, wrap angle and vertex fitting distance.

(Best)—Personalized, digital PALs incorporate all the above, but individualize the lens using designs that are more task specific, and/or incorporates biometric data like aberrometry analyzed prescriptions, or values from proprietary fitting instrumentation such as eye center of rotation distance, head or eye turning ratios, or the effects of the dominant eye. ■

—Andrew Karp

Giving Customers What They Want

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"In order for the bespoke part of the business to thrive, we need other avenues to keep the business growing," Knight said. "My vision is to keep investing in people and artisans, and growing a brand that is saturated in craft, attention to detail and high ethics within the creation process."

Even with the imminent online expansion, Knight says each frame will continue to be made in the U.S. in his Franklin workshop; he also sees potential for retail partners in New York and Los Angeles in the future.

From the personal but mass-scalable to the painstakingly bespoke, there are many opportunities for customization in eyewear. Where frame designers and manufacturers see the sweet spot for independent optical retailers is for them to incorporate 3D imaging technology, 3D enabled virtual try-on and made-to-order 3D frame ordering into their dispensaries.

"What we are doing for the optical business is changing the old method of doing things to make the business more efficient," said Engelmayer. "For the consumer, we are helping by providing a product made entirely for them—from the prescription down to the frame."

"Our expansion to U.S. soil is a consequence of the major shift in how young Americans perceive quality eyewear and the increasing need to reduce the production time of custom made frames, as well as their costs," said Valmassoi.

"The customer has changed in the past few years, not because there is a new need for eyeglasses, but because before, the frame was seen as medical. Now, people buy frames because they love not just the eyeglasses, but the story behind the brand. You're not just selling a medical device, but selling love with a story of a frame. We're giving this opportunity in a way that is time effective and not too expensive."

And as for the future of customized eyewear: "Customized eyewear will always be something people desire. Companies that really thrive in this world will listen to their clients above all else, and be able to create the products their customers want," Knight said. ■

Hoya's Yuniku System Creates 'Fully 3D-Tailored Eyewear'

Hoya Vision Care recently launched a customized eyewear system called Yuniku that is designed to be installed in opticians' shops. The system, which Hoya spotlighted at last month's Opti show in Munich, takes high-resolution, 3D scans of a customer's facial anatomy to create what it describes as "fully 3D-tailored eyewear."

A joint project with partners Materialise NV, Hoet Design Studio and Aoyama, Yuniku by Hoya is currently available in Europe. According to Hoya, the system enables individualized lens and frame design. Both lenses and frames can be designed and positioned to fit an individual's unique facial features, functional needs and vision requirements, resulting in "an enhanced vision experience, increased comfort and new possibilities for personalization."

"Yuniku is an exciting step forward in custom eyewear. By capitalizing on advances in 3D printing technology, we have removed the limitations posed by traditional spectacles," said Jon Warrick, vice president global marketing, Hoya Vision Care. "For the first time, wearers can enjoy the ultimate in optical performance, without compromising on style or fit."

Materialise, which specializes in 3D printing, partnered with Hoya to create a custom 3D scanner and software platform, directly linked to Materialise's Certified Additive Manufacturing factory. Using 3D scanning, parametric design automation and 3D Printing, the Yuniku platform designs the frame around the ideal position of the optical lenses.

The Yuniku by Hoya system uses 3D scanning, parametric design automation and 3D Printing to design a frame around the ideal position of the lenses.

The Yuniku system captures facial features through a digital scan, and a short questionnaire to determine the wearer's visual needs. Advanced software designed by Hoya uses facial and visual data to determine the ideal position of the lenses in relation to the eyes and communicates this with Materialise's software, which in turn tailors the frame around the lenses according to the wearer's unique facial characteristics.

Frame design, color and finish can all be adjusted to match the customer's individual style, with the integrated software solutions working to ensure that both ideal lens positioning and fit are preserved. Additionally, a screen will display a virtual image of the customer in the selected eyewear.

The base frame collection for Yuniku comes from Hoet Design Studio. As Yuniku is an open platform, further branded frames, from both Hoet, Aoyama and other designers, will be added to the collection. The range features an exclusive selection of frame designs, colors and finishes. These are complemented by a choice of a premium progressive, single vision or indoor lens solution.

Hoya has not yet announced a date for a U.S. release for Yuniku. ■

—Andrew Karp