

**RIDE LIFE.  
RIDE GIANT.**



**2018**

THE ALL-NEW PROPEL DISC RANGE

Photo: Cameron Baird

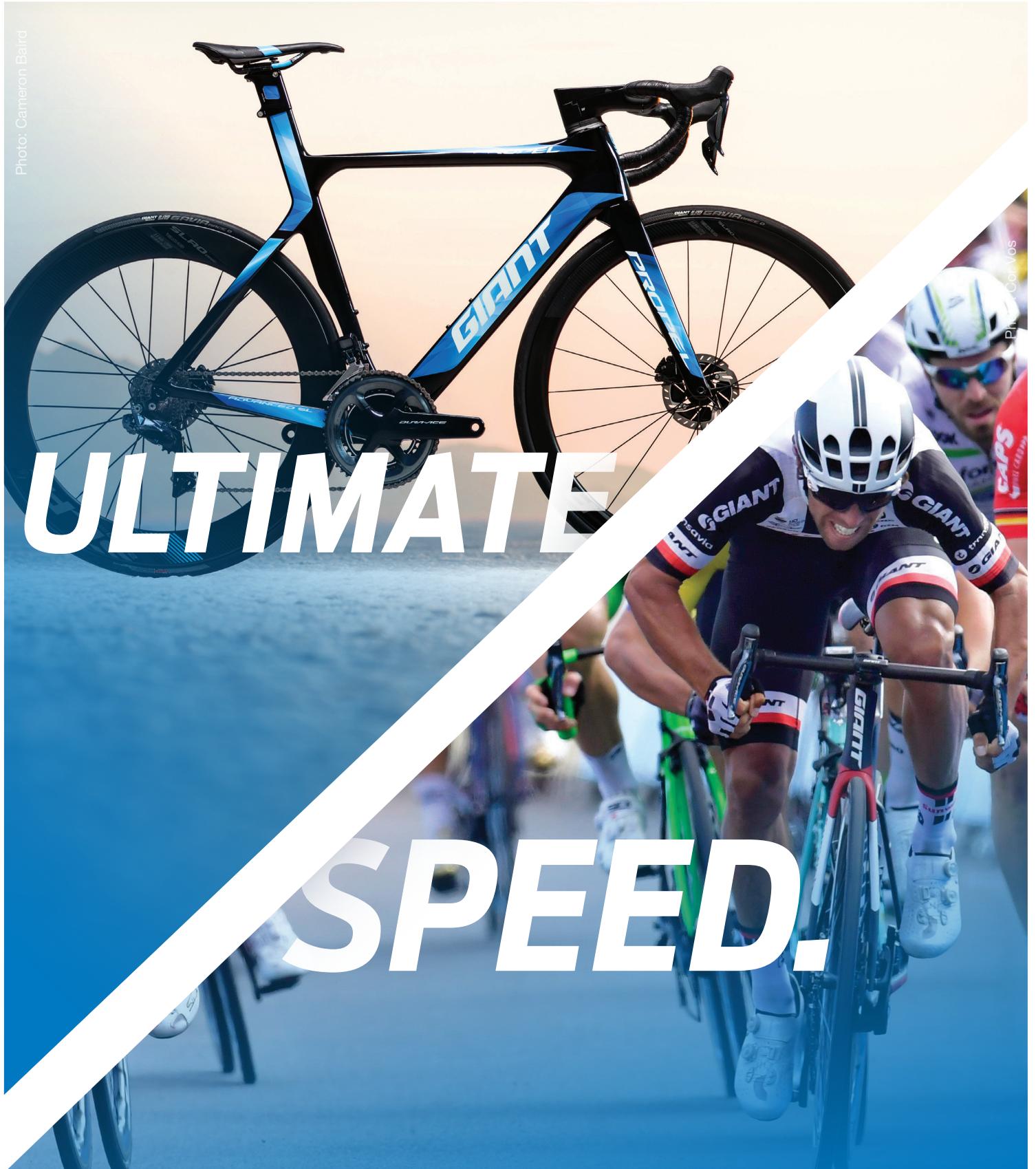


Photo: Cor Vos

**ULTIMATE**

**SPEED.**

# ULTIMATE SPEED.

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The goal was clear: Forget limitations, ignore conventional wisdom, and create a race-winning aero road bike without compromises. To achieve what was previously unachievable.

Superior aerodynamics is a critical part of the equation, but our team of engineers, aerodynamics experts and pro racers wanted more. So we began the process of building an aero road machine that also delivers measurable gains in control and efficiency. It would have disc brakes integrated into the overall design. It would be light and stiff, and would offer previously unattainable aerodynamic performance. It's easy to improve aerodynamic performance by sacrificing stiffness or weight. But we committed to key design elements including a larger headtube, downtube and bottom bracket area that we feel are critical to the bike's efficiency and handling. These decisions help give the Propel Disc an even better stiffness-to-weight ratio and put it well ahead of competitors.

It took three years, radical experimentation with tube shapes, and hundreds of iterations in CFD and wind-tunnel testing, but the final results speak for themselves. The new Propel Disc range delivers ultimate speed with three key benefits: integrated aerodynamics, total control and unrivaled efficiency.



## INTEGRATED AERODYNAMICS

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Using our AeroSystem Shaping Technology process, we took a holistic view of the bike as a complete system, analyzing countless combinations of frameset designs through CFD and wind-tunnel analysis. One of the key breakthroughs is a new truncated ellipse airfoil shape that delivers the best overall aero performance at various wind angles. We also found that, with proper integration, a disc-brake design can actually improve aerodynamic performance. The final step was to refine the entire system at Aero Concept Engineering in Magny-Cours, France. We created a new integrated Contact SLR/SL Aero handlebar/stem unit with internal cable routing and an integrated Giant SLR WheelSystem with aero spokes. The rear wheel has a taller 65mm rim depth, proven in wind-tunnel testing to produce minimal drag. The front wheel, which is more affected by crosswinds, features a shallower 42mm rim. This further boosts the bike's aerodynamic performance by lessening the effect of crosswinds on the front wheel while also reducing overall drag. To accurately simulate real-world riding conditions, our team of aerodynamics experts created a dynamic mannequin. Other bike manufacturers use static mannequins, but only a dynamic one can accurately replicate the effects of a rider pedaling with various wind angles.

## TOTAL CONTROL

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With its new integrated disc-brake technology, the Propel Disc range delivers superior braking power and greater modulation in wet or dry conditions. This was a critical performance demand from our pro road racers, who typically race for hours on twisting terrain with high-speed descents and cornering before they make the decisive breakaway or sprint for the finish. The integrated Giant WheelSystem further improves control. The rear wheel, less affected by crosswinds, has a 65mm deep rim for uncompromising aero performance and power transmission. The front has a shallower 42mm rim for added control in crosswinds. The result is a bike that not only accelerates and slices through wind faster, but also corners with greater precision and handles better in all types of racing situations.



## UNRIVALED EFFICIENCY

The frameset of the new Propel Advanced SL Disc, including the new integrated stem and handlebar, is lighter than that of key competitor bikes including the Specialized Venge Disc and Trek Madone. Tests show that the Propel Advanced SL Disc frame is also stiffer than those competitor bikes. A lighter chassis gives the new Propel Disc range a livelier ride quality, producing more explosive acceleration. Increased frame stiffness means better power transmission, enabling the rider to reach and maintain higher speeds with less effort. The combination of lower weight and higher stiffness adds up to unrivaled efficiency.



Throughout the process of creating the new Propel Disc range, Giant engineers worked closely with the pro riders who would someday race on it. We collaborated with Team Sunweb's technical staff and key riders to produce an uncompromising race bike. The final stamp of approval came from the world-class sprinters like Tour de France green points jersey winner Michael Matthews who look to Giant for a competitive advantage. Now those same advantages are available to you.



# INTEGRATED AERODYNAMIC DESIGN

Central to Giant's AeroSystem Shaping Technology is the belief that an aerodynamic bicycle should perform just as well on the road as it does in the wind tunnel. To engineer the new Propel Disc frameset, we used Computational Fluid Dynamics and wind-tunnel tests to create new airfoil sections with a truncated ellipse shape—a design approach that consistently offers lower drag coefficients at a wider range of yaw angles compared to traditional “teardrop” frameset shaping. We began by analyzing more than 300 iterations of tubing through CFD. Then we tested tube shapes in water and wind tunnel tests. And finally, we refined the entire system—including frame, fork, cockpit and WheelSystem—at the ACE facility in Magny-Cours, France.



Beyond the chassis, we created a new integrated Contact SLR/SL Aero handlebar/stem unit with internal cable routing and an integrated Giant SLR WheelSystem with aero spokes. Our research revealed that the ideal wheel setup to minimize drag without sacrificing stability in crosswinds is a combination of two different rim depths. The rear wheel has a taller 65mm rim depth, proven in wind-tunnel testing to produce minimal drag. The front wheel, which is more affected by crosswinds, features a shallower 42mm rim. This further boosts the bike's aerodynamic performance by lessening the effect of crosswinds on the front wheel while also reducing overall drag.

Each frame is engineered with flat-mount disc brake technology for the most consistent braking power in all conditions. The front (12 x 100mm) and rear (12 x 142mm) thru-axle setups produce unrivaled steering precision and stiffness. Interestingly, aerodynamic testing also revealed that our disc-brake integration produces less drag than traditional caliper brakes. This is because the location of traditional calipers (either in front or behind the fork crown/legs) creates “dirty” air. Opening up the fork crown area (by placing the disc-brake calipers down at the hub) means that the air hitting the new disc-brake caliper has already been disrupted by the leading edge of the tire/wheel. This effect is further enhanced by an asymmetric fork that helps smooth out airflow over the caliper.

Once the first phase of engineering and development was completed, we moved on to testing at the ACE wind tunnel. To best simulate actual riding conditions, we created a dynamic mannequin. This allows us to more accurately replicate real-world riding forces and conditions without the variables that are intrinsic to testing with human riders. Some other brands use a static mannequin, but our dynamic one more accurately reveals the aerodynamic effects of a rider while pedaling.

We used a 24 mph wind speed in a temperature and humidity controlled environment, with yaw angles ranging from 0 to 30 degrees. With the dynamic mannequin, spinning wheels and moving drivetrain, we were able to produce the most “real world” aerodynamic analysis possible. Our process is an industry first. It helped us sculpt the design of the new Propel Disc range and fine-tune an overall system that considers the aerodynamic forces of rider and bike together.



# WEIGHT COMPARISON

While seemingly objective, frameset weight can be a highly subjective variable—it all depends on what is considered a frameset. Giant defines a frameset as follows:

- Size medium, painted/decaded production frame
- Production fork (uncut)
- Headset/expander/top cap
- Seatpost (ISP or seatpost included with frameset)
- Seat clamp/ISP clamp
- Front and rear derailleur hanger/clamps
- All production hardware (water bottle bolts, etc.)

<b>COMPLETE FRAMESET WEIGHTS (GRAMS)</b>					
	<b>SPECIALIZED VENGE VIAS DISC</b>	<b>TREK MADONE</b>	<b>CANYON AEROAD CF SLX</b>	<b>GIANT PROPEL ADVANCED SL DISC</b>	<b>GIANT PROPEL ADVANCED SL DISC</b>
Frame	1157	1253	950	982	950
Fork	405	369	349	378	380
Stem	537	379	383	198	401
Handlebar				220	
Seatpost	203	175	190	N/A	N/A
Seat Clamp	34	14	19	N/A	N/A
ISP Clamp	N/A	N/A	N/A	175	174
FD Hanger	On Frame	On Frame	11	16	17
RD Hanger	15	12	11	25	27
Expander	33	37	13	15	15
Top Cap	12		13	20	20
Headset and Spacers	104	83	74	44	44
Bottom Bracket	59	52	72	72	72
<b>Total (g)</b>	<b>2559</b>	<b>2374</b>	<b>2085</b>	<b>2145</b>	<b>2100</b>
<b>Difference (g)</b>	<b>+474</b>	<b>+289</b>	<b>0</b>	<b>+60</b>	<b>+15</b>

# STIFFNESS COMPARISON

The essential metric of a racer's performance is power output-to-weight ratio. This pure measurement of efficiency guided the development of the Propel Disc range.

Stiffness was assessed using the protocols established by Germany's *Tour* magazine with size medium (or equivalent) framesets. Unlike many of our competitors, which assess stiffness not with a fork but with a steel bar, Giant tested both steering and pedaling stiffness with the actual fork in place. This provides a far more accurate measure of how a bicycle will perform in real-world conditions, and helps ensure that our testing procedures translate into performance gains that can be felt on the road.

## FRAMESET STIFFNESS TEST

This test determines how much the complete frameset flexes torsionally under load. Each frame is locked at the rear dropouts with lateral force applied to the fork. More frame stiffness means better cornering and response to rider input on the road. Achieving its goal of delivering precise handling and maximum power output, Propel Advanced SL Disc provides 40 percent higher frame stiffness than some of its competitors.

RANK	MODEL	FRAME STIFFNESS (NM/°) (FRAME+FORK)
1	Giant Propel Advanced SL Disc	152.54
2	Specialized Venge ViAS Disc	147.6
3	Canyon Aeroad CF SLX	126.4
4	Giant Propel Advanced SL	112.46
5	Trek Madone	108.9



# CONCLUSION

As the test data shows, the flagship model of the new Propel Disc range has the highest frame stiffness of any other bike in its category, and it beats out most of its key competitors in overall weight. Those two factors together give it unrivaled efficiency on the road. And with its updated AeroSystem Shaping Technology and integrated disc brakes, the new Propel Disc range combines race-winning aero performance with total control on the road.

RANK	MODEL	FRAME STIFFNESS / WEIGHT RATIO
1	Giant Propel Advanced SL Disc	71.1
2	Canyon Aeroad CF SLX	60.6
3	Specialized Venge ViAS Disc	57.7
4	Giant Propel Advanced SL	53.6
5	Trek Madone	45.9







# PROPEL ADVANCED SL DISC

Re-engineered with Giant's AeroSystem Shaping technology, which means that every tube shape and angle is optimized for minimal drag, the Advanced SL-grade composite frame is ultra-stiff and superlight. And its new disc-brake technology is integrated with the frameset, including flat-mount calipers and thru-axles for optimal wheel stiffness and braking performance on the road. For pro-level road performance and the ultimate aero advantage, the new Propel Advanced SL Disc is way ahead of the pack. Here are the core technologies that help the Propel Advanced SL Disc give you a competitive edge:



## TECHNOLOGY

### 1 AEROSYSTEM SHAPING TECHNOLOGY

Through CFD (Computational Fluid Dynamics) and wind-tunnel data, engineers optimize each tube shape to deliver superior aerodynamic performance.

### 2 VECTOR INTEGRATED SEATPOST

Designed as a key performance factor in the overall frameset, the integrated seatpost saves up to 45 grams compared to standard composite posts, while improving aerodynamics and adding road-smoothing compliance.

### 3 ADVANCED COMPOSITE TECHNOLOGY

From bare thread to finished frame, every Giant composite bicycle is designed, engineered and hand-built in our own factory. Using state-of-the-art materials and manufacturing techniques, both Advanced SL-Grade and Advanced-Grade Composite framesets offer outstanding weight, stiffness and compliance characteristics.

### 4 OVERDRIVE 2

Giant's most advanced steerer tube technology offers unprecedented steering precision. Oversized headset bearings (1 1/2" lower, 1 1/4" upper) and a tapered steerer tube produce superior front-end stiffness.

### 5 POWERCORE

A massively oversized bottom-bracket/chainstay area features a fully integrated, 86-millimeter wide bottom-bracket design. Asymmetric chainstays provide additional stiffness on the driveside and stability on the non-driveside.

### 6 RIDESENSE

Giant's chainstay integrated, wireless data transmitter. The removable transmitter sends wheel speed and cadence information directly to any ANT+ compatible computer.

### 7 GIANT WHEELSYSTEM

Engineered with proprietary Dynamic Balanced Lacing technology, Giant's all-new 42/65mm SLR Composite WheelSystem delivers superior efficiency, pinpoint control and supreme aerodynamics. The wheels are integrated with Giant Gavia tubeless tires for added rolling efficiency and a reduced risk of flats.

### 8 INTERNAL CABLE ROUTING

Frame/handlebar/stem feature unique cable porting for sleek, non-cluttered appearance and performance.

### 9 DISC BRAKE INTEGRATION

The frame and fork are engineered specifically for flat-mount disc-brakes, including front and rear 12mm thru-axles for reliable braking performance in all weather and road conditions.

### 10 CONTACT SLR AERO BAR/STEM

Composite integrated handlebar-and-stem unit improves aero performance with wind-tunnel shaped airfoil design and internal cable routing.





# PROPEL ADVANCED PRO DISC

Meticulously developed for best-in-class aero road performance, this razor-sharp road racer offers a true advantage for sprinting and solo riding. And new this year, it also incorporates the superior control of disc brakes. The frame is handcrafted using Advanced-grade composite material to produce a bike that's lightweight and stiff, with a sharp, responsive ride quality. Its disc brakes are completely integrated within the frame using flat-mount calipers and thru-axles designed to optimize the technology. From sprints to solo attacks, cornering and descents, the new Propel Advanced Pro Disc helps you slice through the wind and gain an advantage on the competition.



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### 10 AERO BAR AND STEM

Contact SLR aero composite handlebar and Contact SL Aero alloy stem are designed to reduce overall drag while minimizing weight.





# PROPEL ADVANCED DISC

This all-new aero road bike minimizes drag so you can accelerate and sprint faster. It also introduces full disc-brake integration for more confidence and control in all types of weather and conditions. Engineered with AeroSystem Shaping technology and Advanced-grade composite, it delivers proven aero performance and one of the lightest frames in its category. New integrated disc brake technology includes flat-mount calipers and thru-axles for wheel stiffness and streamlined performance. The lightweight, easily adjustable Vector composite seatpost further minimizes drag. It all adds up to a race-ready machine that helps you leave the competition behind.



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*giant-bicycles.com*

Photo: Cameron Baird



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