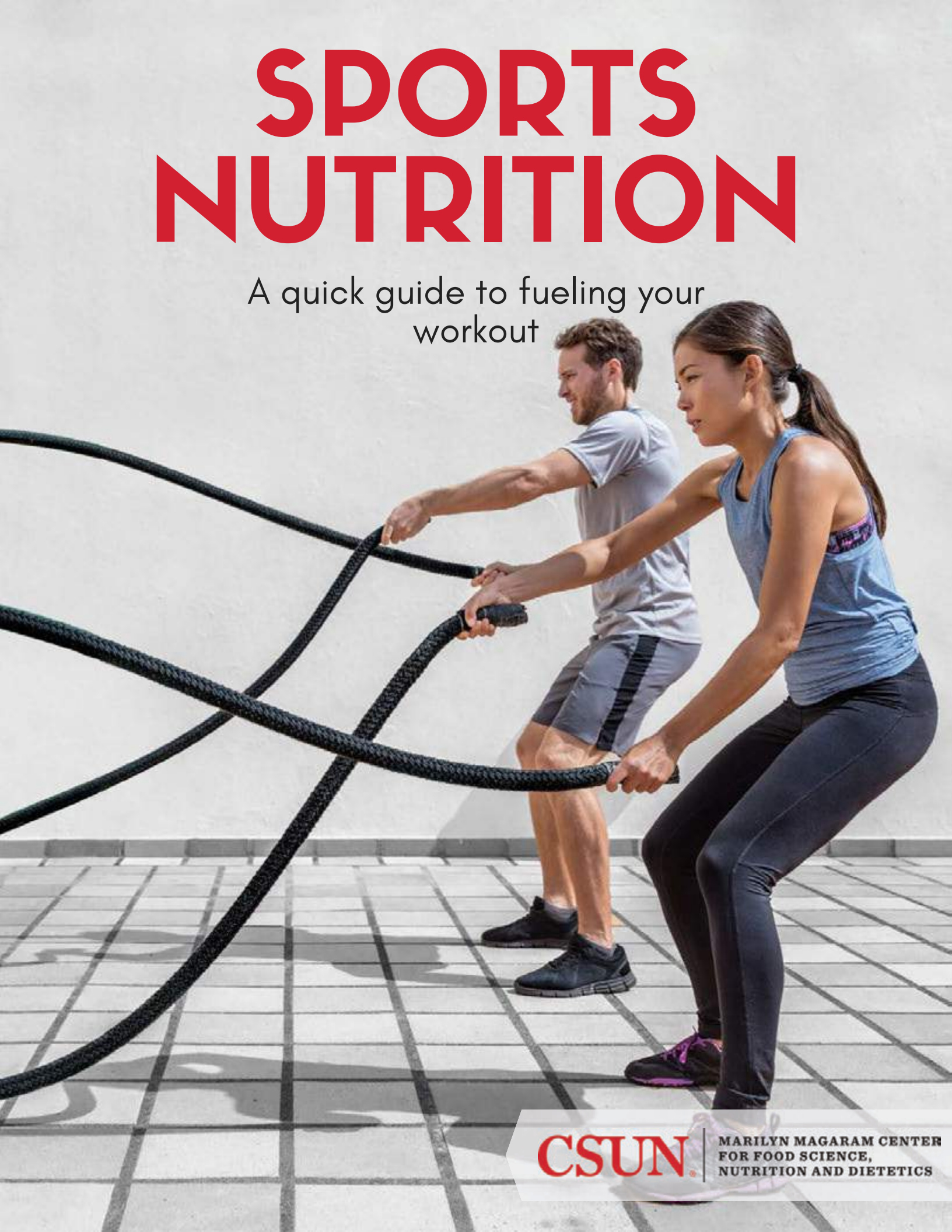
SPORTS NUTRITION

A quick guide to fueling your workout



CSUN | MARILYN MAGARAM CENTER FOR FOOD SCIENCE, NUTRITION AND DIETETICS

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MARILYN MAGARAM CENTER

FIT TO WIN

As an auxiliary center in the Department of Family and Consumer Sciences in the College of Health and Human Development, the Marilyn Magaram Center for Food Science, Nutrition and Dietetics has provided health and well-being through research, education and services since 1991. It is our continued vision to be the recognized center of excellence in food science, nutrition and dietetics serving the global community.

The Marilyn Magaram Center (MMC) for Food Science, Nutrition and Dietetics collaborates with campus partners to increase access to sports nutrition resources through the Fit to Win Program.

Athletes benefit from nutritional guidance, learning how to enhance energy levels, strength, endurance, recovery, and how to prevent injuries and illnesses. Coaches and student-athletes can also rely on the program for current resources and tools.

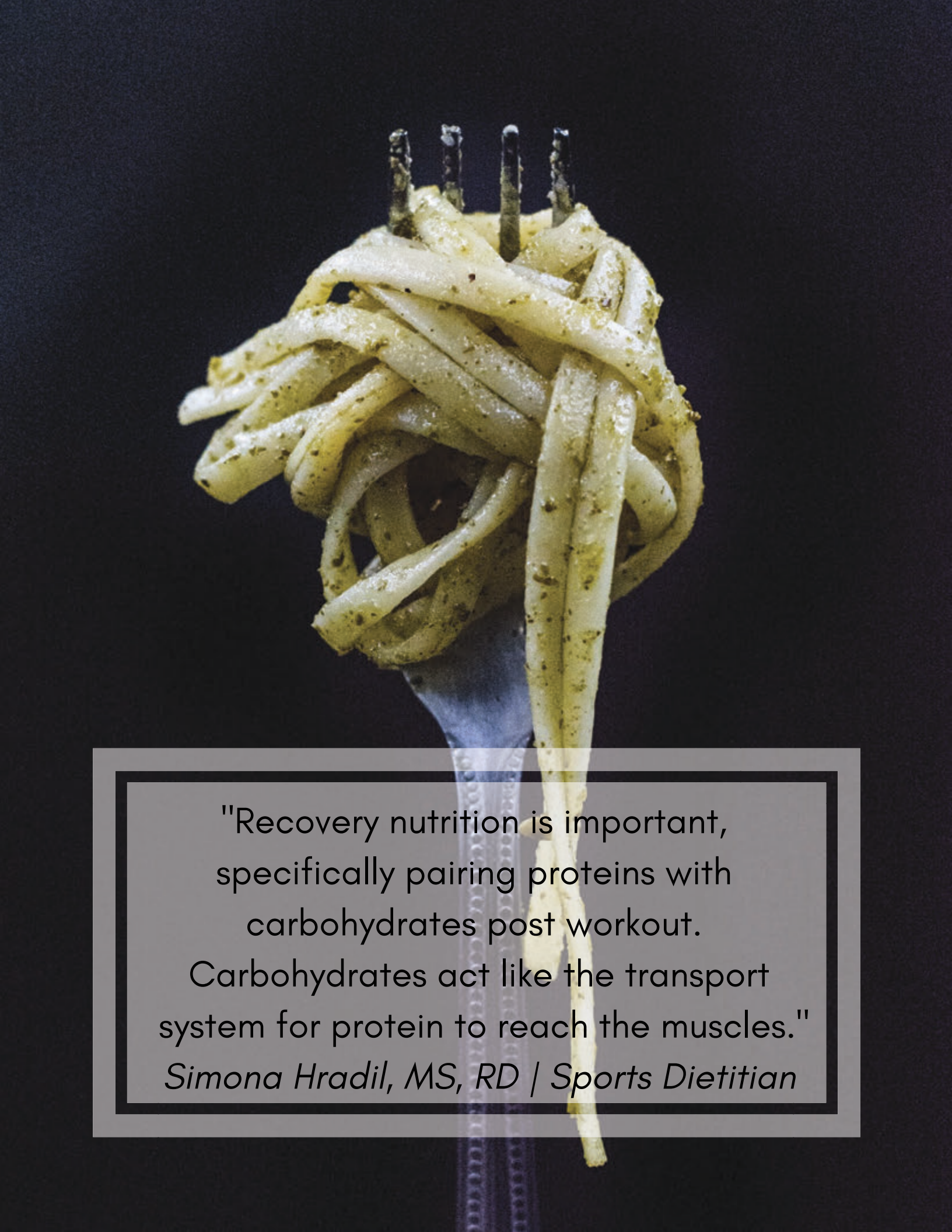
We strive to maximize an athlete's performance by offering:

- BOD POD body composition testing to determine lean muscle tissue and body fat
- Interactive nutrition and cooking workshops
- Tailored nutrition counseling for sport-specific needs to reach peak performance
- Dietary analysis of macro and micronutrients to reach individualized goals

CARBOHYDRATES

Carbohydrates

Eating carbohydrates throughout the day is necessary for athletes to perform at high levels and for anyone to keep in shape. Carbohydrates play a major role in supporting training and recovery, and they also provide the body with its main fuel source during exercise.[1] When consumed, carbs are stored as glycogen in skeletal muscle and the liver with a limited supply. Depleted glycogen levels can lead to fatigue and increased risk for injury. Consuming moderate amounts of carbohydrates around exercise will improve endurance capacity and delay the onset of exhaustion.[1]



"Recovery nutrition is important, specifically pairing proteins with carbohydrates post workout. Carbohydrates act like the transport system for protein to reach the muscles."
Simona Hradil, MS, RD | Sports Dietitian

How Carbs are Used

The majority of carbohydrates contain a mixture of sugar and starch that is converted into glucose to be used as energy. During exercise, glucose is used for working muscles. Storage is limited but energy produced provides more fuel per unit of time than fats.[1] When increasing exercise intensity, carbs become a more prominent fuel source. Carbs can be split into two categories, simple carbohydrates and complex carbohydrates.

Simple Carbohydrates

Source	Serving	Carbs (g)
Plain Bagel	1 bagel	40-50g
White Rice	1 cup	35-40g
Sports Drink	1 bottle	30-40g
Performance Gel	1 gel	20-30g

Simple carbohydrates contain limited fiber, fat, and protein, and are rapidly digested. They can be found in processed foods, soft drinks, sweets, and concentrated fruit juices. Simple carbohydrates can be utilized as a more available source of energy when there is a time constraint before exercise.

Complex Carbohydrates

Source	Serving	Carbs (g)
Brown Rice	1/2 cup	25-30g
Quinoa	1 cup	30-40g
Whole Grain Pasta	1 cup	30-40g
Black Beans	1/2 cup	20-30g
Oatmeal	1/2 cup	20-30g

Complex carbohydrates are slowly digested and have moderate to high levels of fiber. They can be found in whole wheat products, legumes, and starchy vegetables such as corn, green peas, and potatoes. Complex carbohydrates digest more slowly, so it is advised to consume complex carbohydrates 1-4 hours before exercise to prevent stomach distress.

Carbohydrate Timing

Timing carbohydrate intake around workouts helps produce energy to delay fatigue, minimize muscle damage, and reduce recovery time.[2] The body uses simple and complex carbohydrates differently and can handle them more efficiently pre-, during, and post-activity.

Pre-Workout

Consuming complex carbohydrates 1 to 4 hours before a workout can stimulate energy and power during exercise.[1] Consuming simple carbohydrates 30 minutes to 1 hour before exercise can improve performance.[3] Meals eaten closer to workout time should be smaller.

During Workout

Consuming simple carbohydrates throughout a long workout (over 2 hours) can help improve performance.[3] Aim for 30-60g of carbohydrates per hour during high intensity training lasting 2 hours or more.

Post-Workout

Restoring lost energy is important for recovery. High intensity and/or long duration exercise sessions deplete muscle glycogen. Post exercise, it is importance to replenish glycogen stores by eating a meal containing moderate to high carbohydrates.

8:00 am Breakfast
- 1 plain bagel
- 1 cup Greek yogurt
- 1 cup strawberries

10:00 am Workout
- 1 sports drink

1:00 pm Lunch

Southwest Chicken Bowl
- 1 cup kale
- ¼ sweet corn
- ½ cup quinoa
- ½ cup black beans
- 4oz. chicken

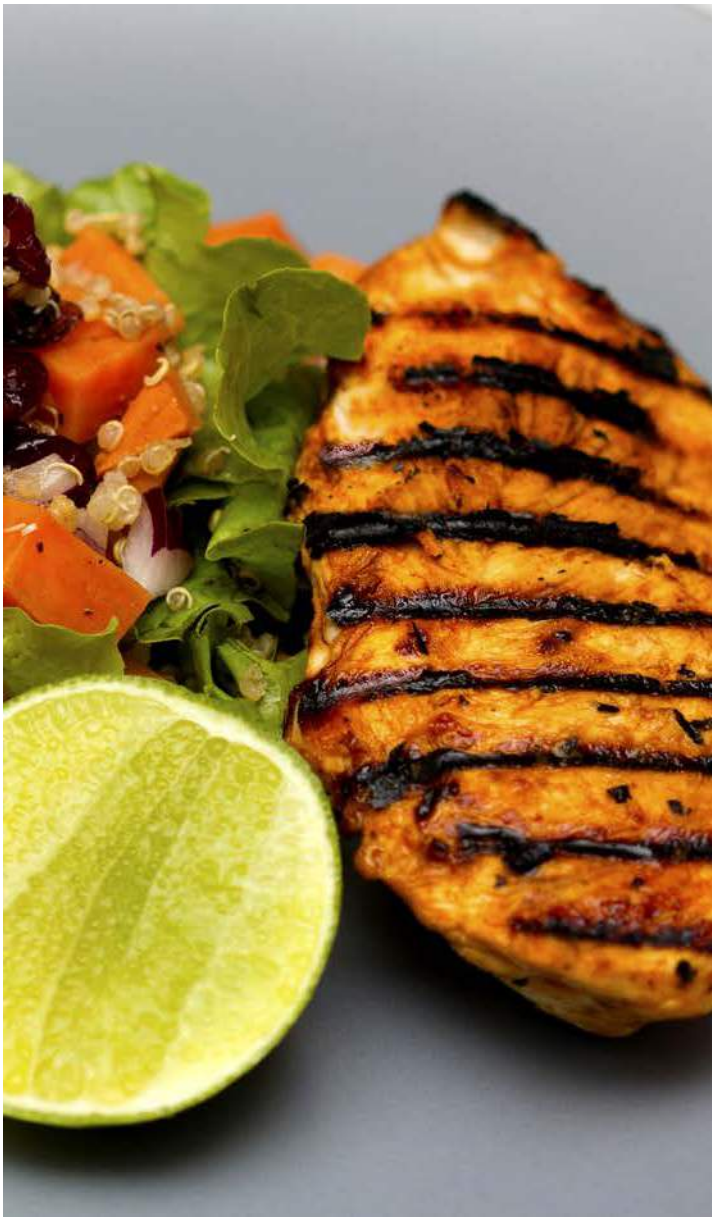

PROTEIN

Protein

Protein helps keep bones, skin, and muscles healthy and strong and it reduces exercise-induced muscle damage. Although protein can be used as a source of energy, it is best used for muscle building and maintaining lean body mass. Protein requirements can vary depending on gender, age, type of sport, time of season, and personal goals.[1]

Types of Protein

Proteins can be classified as either complete or incomplete. A complete protein contains all nine essential amino acids (which must be consumed through the diet and which the body needs for repair and maintenance). Incomplete proteins are missing one or more essential amino acids. Complete proteins are found in animal products. Incomplete proteins are so named because they do not contain all nine essential amino acids. These are generally plant-based (with a few exceptions).



Complete Protein Sources

- Chicken
- Beef
- Pork
- Milk
- Cheese
- Yogurt
- Quinoa
- Tofu
- Soy

Incomplete Protein Sources

- Asparagus
- Rice
- Beans
- Lentils
- Corn
- Artichokes
- Brussel Sprouts
- Nuts and seeds
- Wheats and oats

High Quality Protein Sources

- Meat
- Fish
- Dairy
- Eggs
- Soy

Plant-Based Protein

You can combine various plant-based protein sources together to achieve a complete essential amino acid profile.

Complete Protein Combinations
Rice + beans
Corn + legumes
Oats + nuts
Grains + legumes
Nuts / seeds + legumes
Beans + grains, nuts, or seeds
Vegetables + grains, nuts, or seeds

Protein Source	Serving Size	Protein
Lentils	1/2 cup	9g
Soy Milk	1 cup	8g
Peanut Butter	2 tbsp	7g
Pinto Beans	1/2 cup	6g
Almonds	1 oz	6g
Flax Seeds	1 oz	6g
Chia Seeds	1 oz	5g
Quinoa	1/2 cup	4g
Green peas	1/2 cup	4g

Calculating Protein Needs

For the general population, it is recommended to have 0.8 grams of protein per kilogram of body weight.[4] Athletes should consume between 1.4-2.0 grams of protein per kilogram of body weight, but the actual number will differ depending on each athletes size, goal, and training schedule.[1]

Sample Calculation

Athlete weighing 170 pounds (lbs)

1. Convert pounds to kilograms

$$\frac{170 \text{ lbs}}{2.2} = 77.3 \text{ kg}$$

2. Multiply the protein needs by weight

77.3 kg X 1.6 g =

124 g protein per day

Calculate Your Own

1. Convert pounds to kilograms

$$\frac{\text{Your weight (lbs)}}{2.2} = \quad \text{kg}$$

2. Multiply the protein needs by weight

Your weight (kg) X 1.6 g =

g protein per day

Protein Timing

Pre-Workout

A pre-workout meal is considered to be anything eaten 1-4 hours before your workout. This meal contributes to optimal performance. Consider having a small meal low in fat and fiber, or consider a liquid meal to ensure adequate protein and carbohydrate intake. If you are eating closer to your training time, choose an easily-digestible meal.[5]

Almond Butter and Banana Triangles

Ingredients

- 2 Tbsp. almond butter (or nut butter of choice)
- 2 medium tortillas
- 1 banana, ripe, sliced
- 1/2 tsp coconut oil
- 1 tsp honey (Try MMC's "Bee a Matador" Honey)

Post-Workout

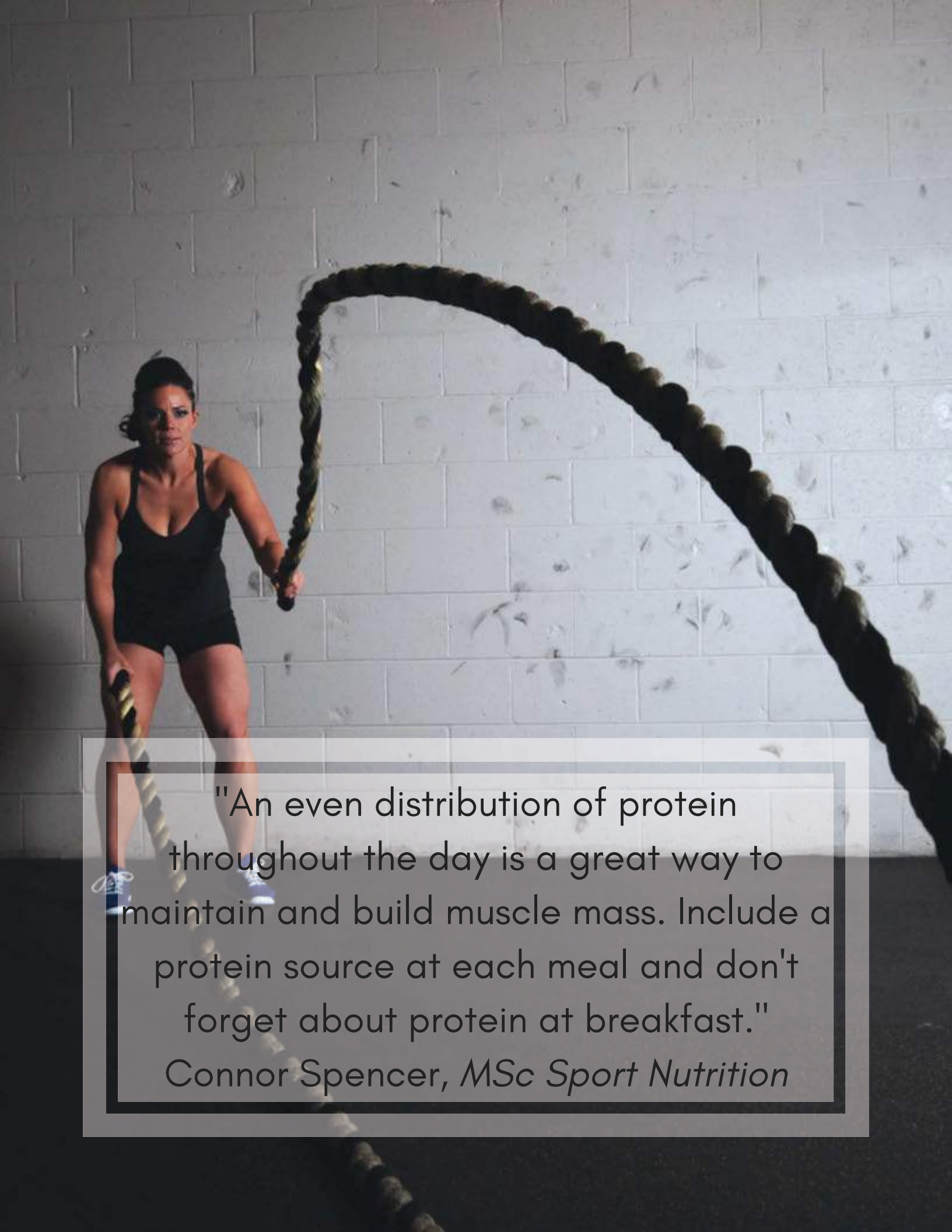
After a workout, your body is breaking down protein. Post-workout meals should be consumed within 1-2 hours after training. The intensity of your workout will also determine if you will require more or less protein post-workout. Remember that carbohydrates are needed post-workout to ensure delivery of protein into the muscles for rebuilding and repair.

Recovery Smoothie

Ingredients

- 1 cup Greek yogurt, non-fat, plain
- 1/4 cup frozen blueberries
- 1/4 cup frozen blackberries
- 1/4 cup frozen strawberries
- 1/2 cup tart cherry juice
- 2 cups water
- 2 cups spinach
- 30g protein serving from protein powder of choice
- 1 tablespoon hulled hemp hearts

More recipes can be found in our Athlete's Cookbook:



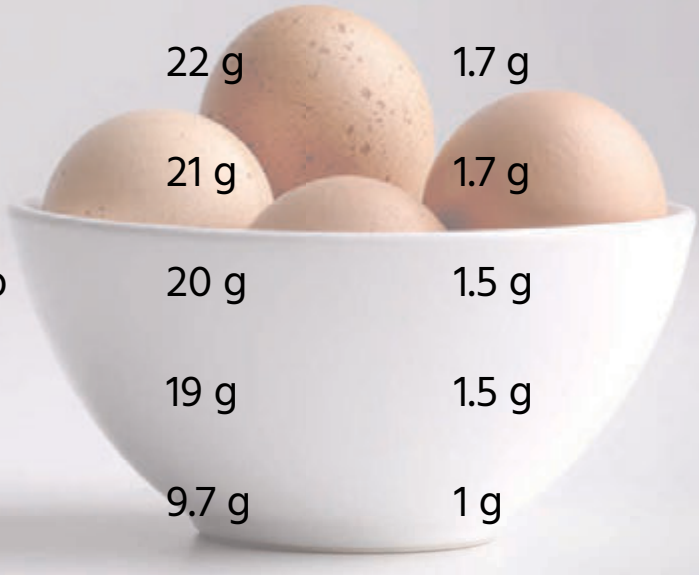
"An even distribution of protein throughout the day is a great way to maintain and build muscle mass. Include a protein source at each meal and don't forget about protein at breakfast."
Connor Spencer, *MSc Sport Nutrition*

Amino Acids

Amino acids are the building blocks of protein. There are over twenty different amino acids. There are nine amino acids the body needs to receive from food.[4] The nine amino acids are histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan, and valine. When exercising, the three branched-chain amino acids (leucine, isoleucine, and valine) are known to help reduce muscle damage, provide energy, and enhance performance. Protein with high leucine content is recommended, as this will help with building and repairing muscles.

Sources of Leucine[6]

Protein Source	Serving	Protein	Leucine
Chicken, Breast	3 oz	26 g	2.2 g
Salmon, Canned	3 oz	22 g	1.7 g
Beef Patty, Lean	3 oz	21 g	1.7 g
Tofu, Firm	1/2 cup	20 g	1.5 g
Egg, Large	3 eggs	19 g	1.5 g
Yogurt, Skim Milk	6 oz	9.7 g	1 g
Beans, Black	1/2 cup	7.6 g	0.6 g
Peanut Butter	2 tbsp	8 g	0.5 g




FATS

Fats

Fats are a major fuel source within the body.[1] Fats play an important role in many physiological functions including energy production, hormone production, and inflammation control.[1] There are a variety of different types of fats in foods including triglycerides, phospholipids, and cholesterol. This guide will focus on triglycerides.

Triglycerides serve as an essential source of energy.[1] Triglycerides can be characterized as unsaturated or saturated fats. Unsaturated fats include monounsaturated and polyunsaturated fats. It is important for athletes to understand food labels to carefully assess the type of triglycerides they are ingesting.

"Essential fatty acids, especially Omega-3's, are vital post exercise for maintaining hormone levels in the body to promote lean muscle mass and decreasing inflammation necessary for recovery."

Simona Hradil, MS, RD | Sports Dietitian

Unsaturated Fats

Unsaturated fats are recommended to be consumed daily. These fats are typically liquid at room temperature and arise from plant-based sources. Unsaturated fats consist of monounsaturated and polyunsaturated fats. Unsaturated fats provide health benefits including lowering blood pressure, improving cholesterol levels, reducing cardiovascular risk and improving brain health. Unsaturated fats are commonly referred to as "Omega-3" and "Omega-6" essential fatty acids and must be obtained from the diet.[4]

Monounsaturated Fats

- olive oil
- safflower oil
- sunflower oil
- avocado oil
- macadamia oil
- macadamia nuts
- olives
- peanuts
- hazelnuts
- almonds
- pecans
- avocados

Polyunsaturated Fats

- salmon
- sardines
- mackerel
- rainbow trout
- sea bass
- sunflower seeds
- chia seeds
- walnuts
- pine nuts
- safflower oil
- almonds

Saturated Fats

Saturated fats are recommended to be consumed in moderation. These fats are found naturally in animal sources such as meat and dairy products.[4] This type of fat is typically found solid at room temperature.[1] A diet high in saturated fat may lead to increased levels of cholesterol, increasing risk of heart disease.[1] Saturated fats should be consumed in moderation and it is recommended to choose leaner cuts of beef, pork, and poultry.

High Fat Dairy Products

butter
cheese
cream
ice cream
whole milk
2% milk
4% cottage cheese

Tropical Oils

palm oil
palm kernel oil
coconut oil

Baked Goods

cookies
pastries
croissants

Meats

hot dogs
bologna
poultry skin
bacon fat
lard
salami

Learn More with Us!

Do you want to learn more about your body composition?

Contact the Marilyn Magaram Center (MMC) in Sequoia Hall 120 for a BodPod service. The BodPod uses air displacement techniques to calculate lean muscle tissue and percentage of body fat.

Do you want to learn cooking skills and expand your nutrition knowledge?

The MMC holds numerous workshops and events throughout the year. Athletes can participate in summer athlete cooking workshops. We also offer numerous virtual workshops.

Do you want to discuss your current diet and what you can possibly change?

If you are a student athlete, consult with your sports dietitian for nutritional advice and an individualized plan. All students may schedule an appointment with a Peer Nutrition Counselor or Registered Dietitian through the Klotz Student Health Center. Community members may consult a dietitian through the MMC. The MMC offers a dietary analysis of macro and micronutrients to help you reach your individual goals.

Nutrition Experts

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California State University, Northridge is a vibrant, diverse university community of 38,310 students and more than 4,000 faculty and staff, sited on a 356-acre campus in the heart of Los Angeles' San Fernando Valley. Cal State Northridge is committed to the educational and professional goals of students and to extensive service to the community.

Photo Taken Prior to COVID-19

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