GUSTAVUS ADOLPHUS COLLEGE

SUGAR

Bringing Sweetness to Light

OCTOBER 7 & 8, 2025

GUSTAVUS ADOLPHUS COLLEGE

THE NOBEL CONFERENCE®

GUSTAVUS ADOLPHUS COLLEGE

Welcome

TO NOBEL CONFERENCE 61

I am delighted that you are joining us at Nobel Conference 61, where we'll take a deep and critical look at one of the most powerful substances shaping our lives: sugar. During my early work in the Florida Everglades, I studied the delicate balance between a thriving economy sustained by the sugar industry and the declining health of the Everglades ecosystem. Sugar has always lived in tension: life-giving and life-threatening, healing and harmful, an economic driver and an environmental threat.

At Nobel Conference 61, we will explore with leading thinkers and researchers the many faces of this remarkable molecule and the roles it continues to play in our bodies, cultures, and the planet.

Sincerely,

John C. Volin, PhD
President,
Gustavus Adolphus College

Sugar is often reduced to a flavor, a dietary concern, or a substance to be restrained. Yet it is far more than a sweetener. Sugar is a complex molecular language spoken throughout the body, a global commodity shaped by centuries of empire, and a cultural signifier deeply embedded in ritual, memory, and identity. It exists simultaneously as nutrient and toxin, symbol and commodity, raw material and refined art. It is embedded in the chemistry of our cells, our economies, our histories, and our desires. This conference takes sugar seriously, as a lens through which to examine what it means to be human, biologically and culturally.

In the body, sugar is fundamental. Glucose drives cellular activity and fuels critical physiological processes. But sugar also plays more intricate, lesser-known roles. Large sugar molecules known as glycans form complex "forests" on the surfaces of all living cells. These molecular coats guide immune recognition, mediate inflammation, and are now being studied as potential vehicles for delivering cancer therapies directly to malignant cells. In this sense, sugar is not just fuel—it is information, structure, and strategy.

At the same time, our consumption of dietary sugars such as sucrose and fructose has become a subject of increasing concern; scientists from a variety of disciplines are working to understand its impacts on our health and our behavior. Emerging research in neuroscience and psychology explores the extent to which sugar affects the brain's reward pathways; scientists are studying the ways in which its patterns of craving, dependence, and withdrawal resemble responses to drugs of addiction such as alcohol. Large-scale epidemiological studies have shown that diets high in sugar-sweetened beverages are strongly correlated with obesity, diabetes, and cardiovascular disease. These findings raise questions about how modern food systems exploit innate human preferences for sweetness, and have broad implications for public health policy, corporate responsibility, and personal choice.

Sugar's significance extends far beyond the bounds of our bodies. As a commodity, sugar has been central to the formation of the modern global economy. Its cultivation and trade structured early forms of capitalism, industrial agriculture, and colonial exploitation. The global sugar economy—rooted in the violent extraction of labor and land—connected plantations in the Caribbean and Americas to markets in Europe and financial systems worldwide. The island of Haiti, once the world's most productive sugar colony, stands as a stark case study: the wealth generated by enslaved labor fueled empires, while the Haitian revolution, born in resistance to this system, reshaped the politics of slavery and independence across the Atlantic world. These legacies are not remote—they are inscribed in the landscapes of inequality that persist today.

Sugar continues to function as a keystone in global trade. Analysts trace its impact on agricultural subsidies, labor conditions, and the geopolitics of food pricing. Its economic footprint is large, and its market behavior remains unpredictable, driven by everything from weather patterns to trade agreements to shifts in consumer sentiment. Sugar is, quite literally, a volatile substance.

And yet, sugar is also a material of extraordinary creativity. In pastry kitchens, sugar becomes architecture, gloss, and transformation. It caramelizes, crystallizes, and aerates. It balances acidity, enhances aroma, and suspends texture. Sugar is not just a sweetener—it is a tool, a medium, and a challenge. In the hands of a skilled pastry chef, it marks a unique convergence of chemistry and craft, necessity and celebration.

What emerges is a substance that cannot be reduced to a single definition or discipline. Sugar is molecular and historical, intimate and imperial. It fuels the body and complicates the mind. It evokes comfort while revealing violence. It is woven into economies and rituals, health crises and holiday cakes. Understanding sugar means moving across scales—from the subcellular to the global—and across categories—from the scientific to the symbolic.

This conference brings together researchers and thinkers from physiology, psychology, history, anthropology, economics, and the culinary arts to approach sugar in its full complexity. By examining sugar not as a problem to be solved but as a phenomenon to be understood, we open space for richer questions—and perhaps, more thoughtful answers—about how we live, eat, remember, and relate.

Sincerely,

Phillip Voight, *Associate Professor of Communication Studies, Director of the Nobel Conference*

Lisa Heldke '82, *Professor of Philosophy, Chair of the 61st Nobel Conference*

OCTOBER 7
Tuesday
SUGAR IN US

8:30 a.m. Doors Open to Christ Chapel

SESSION 1

8:45 a.m. Musical Prelude

Dr. Chad Winterfeldt
Cantor of Christ Chapel

Hudson Nichols '26 and Gracelyn Szynal '26, *trumpet*;
Dominic Snyder '27, *horn*; Zach Mangan '26, *trombone*; Barrett Loof '28, *tuba*

Offertoire in F sharp minor	César Franck (1833–1890)
Trumpet Tunes	Brenda Portman (b. 1980)
Prelude in F major	Fanny Mendelssohn Hensel (1805–1847)
Grand Choeur Dialogué	Eugène Gigout (1844–1925)

9 a.m. Academic Procession & Conference Opening

Processional — **Marche Triomphale**
Siegfried Karg-Elert (1877–1933)

Welcome — **John Volin, PhD**
President of the College

Conference Introduction — **Phillip Voight, PhD**
Nobel Conference Director, Professor of Communication Studies

Lisa Heldke '82, PhD
Nobel Conference 61 Chair, Professor of Philosophy

9:30 a.m. First Lecture

Frank Hu, PhD, MD
Professor of Nutrition and Epidemiology, Harvard T.H. Chan School of Public Health

Introduction — **Stephanie Otto '00, PhD**
Professor of Health and Exercise Science

Frank Hu, PhD, MD
Professor of Nutrition and Epidemiology, Harvard T.H. Chan School of Public Health

How Sweet is Too Sweet? Health Effects of Sugars and Artificial Sweeteners

What does the word "health" mean to you, and what roles does food play in our health? We know that food can heal and food can hurt. An absence of certain foods can cause harm and disease, but too much of certain foods can have the same effect. According to the Pew Research Center, about 40 percent of people report restricting their consumption of sugar. Is the case against sugar really that simple? Where do we start as we stand in the grocery store aisle and make the choice to put something into the cart or leave it on the shelf?

Dietary guidelines, such as those developed federally by the Departments of Agriculture and of Health and Human Services, and by nonprofit organizations such as the American Heart Association and the American Diabetes Association, help us understand how to choose foods to aid in the prevention of nutrient deficiencies and chronic diseases such as cardiovascular disease. But researchers are discovering that there is much more to the relationship between nutrition and health. It is, for instance, a much more individualized matter than those dietary guidelines might suggest.

Frank Hu is helping to uncover the vast differences in the ways in which individual bodies metabolize particular nutrients. Thanks to his research, we better understand how certain physiological variables such as lipid profile and physical activity combine with the gut microbial environment to shape how a body responds to sugar, and, further, how these variables can explain why different bodies respond so differently. Hu's research is contributing to the development of new strategies for creating personalized nutrition recommendations that can improve our health by taking into account these additional factors.

Sugar is everywhere and we humans are hardwired to desire it—but our bodies don't all respond to it in the same way. Furthermore, our bodies respond differently to the forms in which we consume that sugar. A solid body of research suggests that individuals who consume sugar-sweetened beverages are more likely to develop obesity and Type 2 diabetes than those who do not. Hu's research shows that our bodies' mechanisms for telling us when to stop are at a disadvantage when we consume calories in liquid form. When carbohydrates like sugar are consumed in a liquid form, research indicates that people fail to reduce their total calorie intake in future meals which is referred to as incomplete dietary compensation. Fructose in particular is thought to decrease insulin and leptin release when consumed which may lead to a decrease in the stop signals that are sent to the brain.

Hu takes inspiration from the view that "food is love, food is joy, and food is culture." It seems, however, that at times, love, joy, and cultural norms can be at odds with health. What humans love to eat might also harm. The line between pleasure and pain can become fuzzy.

An elected member of the National Academy of Medicine, Hu is the Fredrick J. Stare Professor of Nutrition and Epidemiology at the Harvard T.H. Chan School of Public Health at Harvard University, and Professor of Medicine at Brigham and Women's Hospital. He received his MD from Tongji Medical College, Huazhong University of Science & Technology, in Wuhan, China, and his PhD in epidemiology from the University of Illinois at Chicago.

His Lecture

In this talk, we'll unpack how added sugars—especially those found in sodas, sweetened beverages, and processed foods—affect our bodies and hearts and explore just how much might be "too much." A growing body of evidence shows that high intake of added sugars is linked to serious health problems, including obesity, Type 2 diabetes, cardiovascular disease, fatty liver, and hypertension. These effects aren't just about extra calories—sugar, particularly in liquid form, can directly promote fat storage in the liver, raise blood pressure and blood fats, and worsen insulin resistance. More recently, research has revealed new pathways through which sugar may harm health. A large study of Latino adults found that people who consumed more sugary drinks had changes in their gut bacteria and blood metabolites that predicted a higher risk of Type 2 diabetes over time. These findings suggest that added sugars can disrupt metabolism in ways that go beyond what we've traditionally measured. Artificial sweeteners are often used as substitutes, but they are not a free pass. Emerging studies suggest that some non-nutritive sweeteners may also disrupt the gut microbiome and negatively affect metabolic responses in certain individuals.

10:15 a.m. Second Lecture

Nicole Avena, PhD
Associate Professor of Neuroscience, Icahn School of Medicine at Mount Sinai

Introduction

Kelle Nett '16, PhD
Assistant Professor of Psychology Science

Nicole Avena, PhD
Associate Professor of Neuroscience, Icahn School of Medicine, Mt. Sinai

Sugar Less: Conquer Your Addiction

In the early 2000s, the concept of food addiction was largely dismissed. Addiction research focused on traditional substances like cocaine, heroin, or alcohol, overlooking the possibility that a common, naturally occurring substance like sugar could have similar effects on the brain. Dr. Nicole Avena's early research directly challenged this view, showing that sugar could induce brain and behavioral changes mirroring the long-term biological effects of drugs of abuse. This meant sugar, like addictive drugs, could lead to bingeing, withdrawal, intense cravings, and measurable alterations in brain chemistry. Much like drug addiction, this wasn't just about a lack of willpower; it was about fundamental neurobiological processes.

Avena's research bridged the gap between addiction science and nutrition, forcing researchers, clinicians, and the public to rethink what constitutes an "addictive" substance. Her findings are foundational to a growing body of work demonstrating that sugar's effects on our behavior stem from basic neural mechanisms that have evolved over millennia. These mechanisms were not built for a modern food environment saturated with highly palatable, sugar-laden options. Therefore, it's perhaps no surprise that Avena's findings have profound implications for public health, influencing everything from dietary guidelines to strategies for preventing and treating eating disorders.

Throughout her career, Avena has been a prolific and influential voice, authoring scholarly articles and impactful, best-selling books on sugar addiction and nutrition. Her work aims to provide individuals with practical strategies to navigate a sugar-saturated world. Beyond her writing, she frequently speaks at events, sharing research findings on nutrition and offering evidence-based guidance for building healthy eating habits. She also consults with external groups focused on the neuroscience of eating behaviors.

Dr. Avena received her PhD in neuroscience and psychology from Princeton University, where she is currently a Visiting Professor of Health Psychology. Avena is also an Associate Professor of Neuroscience at Icahn School of Medicine at Mount Sinai, where she continues her groundbreaking research on nutrition, diet, and addiction. Her current work focuses on the critical role of nutrition during early life and pregnancy.

Her Lecture

The concept of food addiction has garnered increasing scientific interest, particularly in the context of how sugar-rich foods engage neural circuits implicated in reward, motivation, and addiction. Unlike traditional models of obesity that focus on caloric surplus and metabolic imbalance, recent neuroscientific findings indicate that excessive and repeated consumption of sugar can produce neuroadaptive changes that mirror those seen in substance use disorders. This presentation synthesizes current evidence from neuroimaging, behavioral, and clinical studies that investigate the addictive potential of sugar.

11 a.m. Panel Discussion with Conference Speakers and Audience Q&A

11:45 a.m. Lunch

See lunch options on page 21.

12:30 p.m. Breakout Sessions

Only Breakout Session #1 will be livestreamed.

These 50-minute presentations feature Gustavus faculty and other members of the Gustavus community, exploring sugar-related topics from their own discipline. Choose from among the following.

1. Sugar Cures Baldness!

Location: Nobel Hall of Science, Wallenberg Auditorium

This session will also be livestreamed

The main talks at this conference cover important yet serious sides of sugar, from economic success to slavery to disease to nutrition. In this session, you'll hear quirky tales about how sugars have proven to be good and bad, sometimes at the same time. You will hear about the role that the most-sugary drinks in the world played in the civil rights movement; how purposely attracting ants with sugar led to a Nobel Prize; the link between sugar beets and the Holocaust; and the sugar that came from a meteorite, formed DNA, and cured baldness.

Presenter: Tom Annesley '75, PhD, *Active Emeritus Professor, Michigan Medicine, University of Michigan*

2. Sweetness to the Soul: Sugar and the Bible

Location: Jackson Campus Center, Saint Peter Banquet Room

This session explores the role of sweeteners in the Bible, including the role of honey in biblical stories and metaphors of sweetness in biblical poetry. We will also consider the role of sweeteners in the diet of the ancient Israelites, which was considerably more limited than in contemporary American society.

Presenter: J. Blake Couey, PhD, *Associate Professor of Religion*

3. Ask a Dietitian: Everything You Ever Wanted to Know About Sugar But Were Afraid to Ask

Location: Beck Hall Room 111

An opportunity to ask Dietitian Jen Donkin anything you would like to know about sugar and its relationship to human health.

Leader**:** Jen Donkin, *Registered Dietitian in Gustavus Dining Service and Health Service*

Breakout Sessions continued on next page

4. Not So Sweet? Sugar and Menopause Metabolism

Location: Nobel Hall of Science Room 1413

As women in their 40s and 50s often discover, changing hormone levels during the menopause transition may impact their metabolism. The relationship between estrogen, the brain, glucose, insulin, fat storage, and energy production is a fascinating and under-told story. Come learn about the emerging science and get some practical ideas for addressing this midlife challenge.

Presenter: The Rev. Siri Erickson, PhD, *Founder and Coach, The Compassionate Way*

5. Food Chemistry & Sugar: Pyrolysis vs. the Maillard Reaction

Location: Nobel Hall of Science Kitchen | *Limited to 16 Participants*

Have you ever wondered how biochemistry plays a role in the tastiness of food? Come and learn more about how sugar affects the taste and texture of pastry and the difference(s) between pyrolysis and the Maillard reaction. Create and enjoy your own almond croissant with one of the team members teaching this session.

Presenters: Brenda Kelly, PhD, *Provost*; Brandy Russell, PhD, *Associate Professor of Chemistry;* Mary McHugh, PhD, *Professor of Classical Studies*

6. How Sugar Turned Hawai'i into the 50th State

Location: Beck Hall Room 101

The fiftieth state is a favorite vacation destination, well known for its sandy beaches, tropical sunsets, and festive luaus. Fewer people are familiar with the important role the sugar industry played in transforming the Kingdom of Hawai'i into a U.S. state. This session introduces Hawai'i's history and people and explores the role the sugar industry played in the overthrow of the Hawaiian monarchy and the eventual annexation of Hawai'i by the United States.

Presenter: Kate Knutson, PhD, *Professor of Political Science*

7. Food Writing Workshop and Recipe Swap

Location: Nobel Hall of Science Room 1412

If you have ever been curious about food writing (posting on social media, reviewing restaurants, even authoring a cookbook), here's a small taste of what that might be like. In this workshop, we will sample some brief examples by well-known food writers and then pair up to practice our own descriptive skills, using a recipe as the starting point. Bring a favorite and familiar recipe you're willing to share, along with a notebook or other writing equipment. You'll meet other conference attendees and leave with some inspiration. Sweet!

Presenter: Elizabeth Kubek, PhD, *Faculty Director of Student Academic Success and Professor of English*

8. An Athletic Trainer's Approach to Sugar-Related Emergencies

Location: Beck Hall Room 201

This presentation covers the critical knowledge and actionable strategies used by athletic trainers to effectively manage sugar-related emergencies. From recognizing subtle symptoms to implementing immediate, life-saving interventions, participants will acquire the essential skills to confidently respond to glycemic crises. Participants will learn how to proactively identify at-risk individuals and initiate the proper care needed to stabilize their condition and facilitate their return to optimal health.

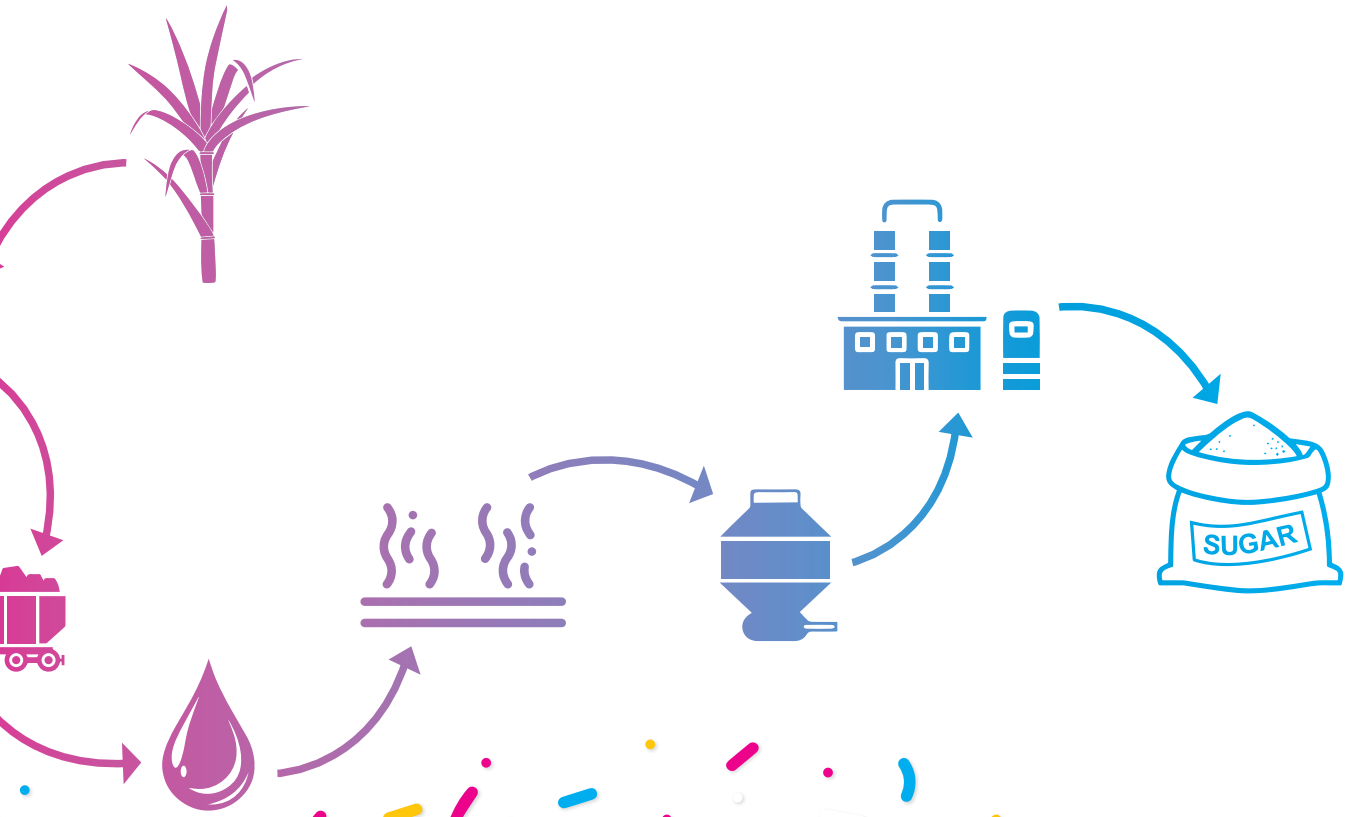
Presenter: Claire Woebke, PhD, *Assistant Professor of Health and Exercise Science and ATP Research Coordinator in Athletic Training*

9. What, Exactly, Makes the Sweet Stuff Sweet? A Look into the Chemical Analysis of Sugars and Sweeteners

Location: Nobel Hall of Science Room 2300

In spite of their importance in food and physiology, the determination (that is, establishing how much is present) of various sugars and other sweeteners is not particularly simple. In this presentation, we will explore what makes these analyses challenging, and some of the chemical analysis methods that are used most commonly to tackle the challenge. These techniques will include liquid chromatography and mass spectrometry, and we will also share how Gustavus students are doing research to advance the utility of these methods.

Presenter: Dwight Stoll, PhD, *Professor of Chemistry and Co-Chair Department of Chemistry*



SESSION 2

1:30 p.m. Musical Prelude

Dr. Chad Winterfeldt
Cantor of Christ Chapel

Passacaglia in C minor BWV 582

Johann Sebastian Bach (1685–1750)

1:45 p.m. Third Lecture

Carolyn Bertozzi, PhD
Baker Family Director, ChEM-H Institute, Stanford University;
Nobel Prize in Chemistry, 2022

Conferral of Honorary Degree Introduction

Brenda Kelly, PhD
Provost

Amanda Nienow, PhD
Professor of Chemistry

Carolyn Bertozzi, PhD
Baker Family Director, ChEM-H Institute, Stanford University; Nobel Prize in Chemistry, 2022

Glycans: The Sugars Coating Our Cells

Human cells—like all cells on Earth—are covered with sugars: large carbohydrate molecules called glycans. Glycans have vastly more complex chemical structures than sucrose, the substance we know as table sugar. In humans, they are long, branching chains of complex carbohydrates formed from nine types of simple sugars called monosaccharides. By contrast, sucrose is formed from two such monosaccharides, glucose and fructose.

In textbook drawings of cells, glycans are often depicted simply as halos around a cell. That's because until recently, little was known about the structure and role of these sugars. As chemical biologist Carolyn Bertozzi often notes, when giving a lecture to a popular audience, she first learned about glycans in a college biochemistry course, where they were described as being like the coating on a peanut M&M: a smooth protective surface that guarded the cell's inner workings. Period. Bertozzi has spent her career exploring glycans: working to understand their structure and identifying ways they can be manipulated to be used as the basis of diagnostics or therapeutics. It turns out they are almost nothing like that delicious candy coating. Glycans represent an important potential source of treatments for cancer and a range of genetic and autoimmune diseases. The glycans on cell surfaces protect healthy cells from the immune system, but they can also shield harmful cells like cancer cells in tumors. Researchers at Palleon Pharmaceuticals, one of eight startup companies Bertozzi has co-founded, are developing ways to chemically alter glycans on specific cells so that the immune system can target and eliminate cancer cells. In December 2024, Palleon entered into a clinical collaboration with the biopharmaceutical company Henlius for a Phase II clinical trial using a Palleon glycan editing platform.

In addition to her innovative work at the interface of chemistry and biology, Bertozzi is well known for her support of underrepresented scientists. When Bertozzi won the 2024 Priestley Medal, the highest honor bestowed by the American Chemical Society (ACS), the Society lauded both for her work in chemistry and for efforts to shape the culture of the field of chemistry. A press release announcing her prize notes that "when she began her career, Bertozzi's field barely tolerated a person like her." Bertozzi is a lesbian. The press release goes on to note that "Bertozzi epitomizes an ongoing cultural shift in chemistry: from professor as resident of the ivory tower to professor as entrepreneur, from scientific silos to interdisciplinary research and team science, and from an old boys' club to an environment that values diversity of background in all its forms." In remarks at Stanford in 2022, Bertozzi notes that her team's diversity "created an environment where we felt we didn't have to play by the same old rules as scientists. We could do things like organic chemistry in living animals—why not?"

After many years on the faculty of the University of California, Berkeley, Bertozzi left to join the newly-formed

interdisciplinary institute ChEM-H (Chemistry, Engineering, and Medicine for Human Health) at Stanford University. Bertozzi's many awards for her work in chemistry include a MacArthur Fellowship (1999) and the Nobel Prize in Chemistry (2022). Her efforts to create a new "culture of chemistry" were recognized with the LGBTQ Scientist of the Year award from the National Organization of Gay and Lesbian Scientists and Technical Professionals.

Her Lecture

All cells possess a sugar coating. Called the "glycocalyx", this coating of complex carbohydrates serves numerous functions in human health and disease. For more than half a century, the structures of cell-surface carbohydrates have been known to undergo changes associated with cancer. Until recently, the significance of these changes was not understood. This presentation will summarize our work toward understanding why cancer cells have an altered glycocalyx and how we are using these findings in the design of new cancer therapies.

2:30 p.m. Panel Discussion with Conference Speakers and Audience Q&A

3:15 p.m. Sugar: Because I'm Lonely

Jill Patterson, Choreographer;
Joanna Mai, Dancer;
Annalise Maiers, Cellist

Location: Christ Chapel Lawn

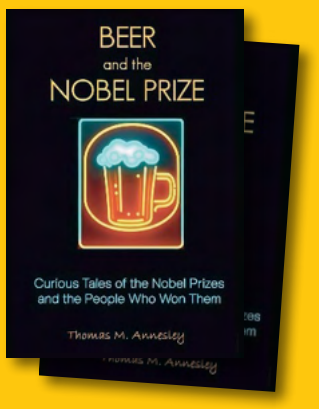
Join us on the lawn of Christ Chapel for *Sugar, Because I'm Lonely,* a trio choreographed by Gustavus dance faculty member Jill Patterson, performed by Gustavus Dance Company members, and accompanied live by Gustavus Symphony Orchestra cellist Annalise Maiers. Witness as dancers move through the sweetest sugar crystals, embodying the effects of glucose on the body, and the ways individuals and society use sugar as a means to feel, to mask emotion, and to celebrate the inevitable ups and downs of life.

3:30 p.m. Book Signing Event

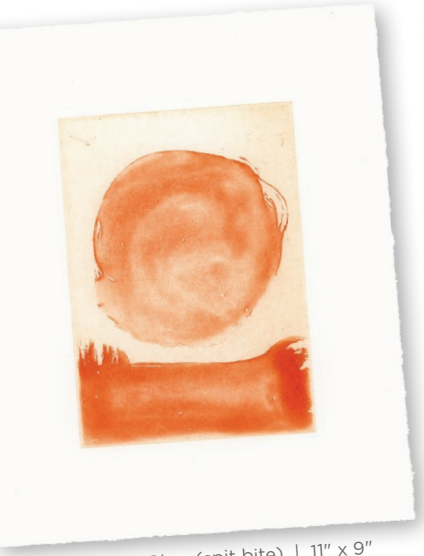
Thomas Annesley, Author

Location: Book Mark, Jackson Campus Center

Author Thomas Annesley will sign copies of his new book, *Beer and the Nobel Prize: Tales of the Nobel Prizes and the People Who Won Them*. The book features dozens of curious tales about the world's most famous prize and the people who have won it. It also uncovers links between everyday items and the Nobel Prize, unusual ways individuals have been notified of the prize, the unique contributions of animals and hobbies, the role of self-experimentation, and much more.



5-7 p.m. Strangeness Should Flow Like Sugar



Tangerine Glow (spit bite) | 11" x 9"

Location: Schaefer Art Gallery, Schaefer Studio Arts building on the south end of campus.
Reception: 5 to 7 p.m. | **Gallery Talk by the Artist:** 6 p.m.
Exhibition runs September 15-October 9

Anda Tanaka, artist and Visiting Assistant Professor of Drawing and Printmaking at St. Olaf College presents a solo exhibition of intaglio prints using the Sugar Lift process. This process involves a sugar-based solution to create a design on an etching plate, which is then coated with an acid-resistant ground. When the plate is submerged in warm water, the sugar dissolves, lifting away the ground and exposing the metal beneath, allowing for etching.

Tanaka is a Minnesota-based artist and educator working primarily in printmaking and drawing. Through quiet observation and appreciation of annual seasons and daily rituals, she creates an abstract visual language that speaks to the repetitive, cyclical nature of domestic life. Anda holds a BA in music and studio art from St. Olaf College, an MFA from Minneapolis College of Art and Design, and has completed a two-year printing apprenticeship with Highpoint Editions at Highpoint Center for Printmaking.

7:30 p.m. Cravings: The Moth StorySLAM
A live storytelling event

Location: Björling Recital Hall
Free and open to the public

Join us for a live storytelling event with The Moth. The Moth aims to promote the art and craft of storytelling, and to honor and celebrate the diversity and commonality of human experience.

Relax and enjoy the show or prepare a story and put your name in the hat!

For this special Nobel Conference StorySLAM, prepare a story to share onstage, or simply join us to listen to the wonderful stories shared by members of our community. Three teams of judges will select one winner, who will progress toward a GrandSLAM Championship.

The theme for the night is... CRAVINGS. Prepare a five-minute story about intense desires fueled by your favorite foods, people, or anything that has hit the "I need it now!" button on more than one occasion. Indulging with conviction or abstaining with difficulty! Sugar tooth, primal desire... your hierarchy of needs. Pickles and ice cream, anyone?

OCTOBER 8

Wednesday

SUGAR IN THE WORLD

8:30 a.m. **Doors Open to Christ Chapel**

SESSION 3

8:45 a.m. **Musical Prelude**

Dr. Chad Winterfeldt
Cantor of Christ Chapel

Le Jardin Suspendu (Chacone) Jehan Alain (1911–1940)
Joies from Trois Danses

Gus Goes There World Premiere

Gus Goes There is an educational video series that puts scientific discovery in conversation with ethical inquiry, and is designed for middle and high school students. With "Gus" the Lion serving as tour guide, each episode explores how thinking about a particular scientific issue has evolved over time. Using footage from more than 60 years of Nobel Conference lectures, the series invites students to think critically about the ways science changes in light of new evidence, new technology and new ways of thinking about the world and our place in it. *Gus Goes There* is challenging students to grapple with the complex intersection of science and technology.

See page 29 for more information.

9 a.m. **Fourth Lecture**

Ulbe Bosma, PhD
Senior Researcher, International Institute for Social History, Amsterdam

Introduction

Kathleen Keller, PhD
Professor of History

For most of human history, sugar was a rarity. It first showed up in Papua New Guinea 10,000 years ago and gradually spread to Asia and the Mediterranean over the next 8,000 years. For many years, sugar was considered a spice.

Ulbe Bosma, PhD
Senior Researcher,
International Institute for
Social History, Amsterdam

From Luxury to Bulk: Sugar's Global Conquest

When you scoop a teaspoon of sugar into your cup of tea or coffee, do you ever think about its origins or history? You may know that sugar cane can only be grown in tropical environments. You may also know that sugar was produced by enslaved Africans on tropical islands in the Caribbean beginning in the 16th century. These are critical facts for understanding the history of sugar, and there is much more. Sugar has a wider global history beyond the Atlantic world in terms of its production, trade, and consumption.

Ulbe Bosma, who hails from the Netherlands, began his study of sugar not in the Caribbean, but in Indonesia. Bosma's earliest historical research focused on Karel Zallberg, a journalist involved in anti-colonial politics in Batavia, Java, in the Netherlands Indies, now Indonesia. Bosma's later work on the Dutch East Indies focused on identity and culture as well as labor exploitation and migration. His fascination with the Netherlands Indies led him to sugar. In 2013, Bosma published a book on the industrialization of sugar production in India and Indonesia beginning in the 18th century under European colonialism. *The Sugar Plantation in India and Indonesia, 1770-2010* shows the divergent paths India and Java pursued in producing sugar. The British largely failed to produce industrialized sugar in India after the abolition of slavery, but the Dutch succeeded, by bringing the plantation system to Java.

Bosma's interest in commodities, labor, and migration led him to write a global history of sugar. *The World of Sugar: How the Sweet Stuff Transformed our Politics, Health, and Environment over 2,000 Years* takes a sweeping look at the history of sugar around the world from the perspective of production, sale, transportation, and consumption. It is a history of culture, business, economics, identity, race, slavery, and capitalism. From Brazil, Cuba, and Jamaica, to India, Taiwan, Java, Egypt, and the United States, Bosma shows us how sugar shaped our world in fundamental ways. Sugar changed our habits of consumption when the Hershey bar came on the market. It led American banks to establish branches in the Caribbean to supply capital to "Big Sugar". And it spurred French engineers to head to Egypt to import their technical expertise.

Unlike many historians, Bosma brings his research on sugar into the present. In his work on southeast Asia and the global history of sugar, he shows how the exploitation of sugar laborers continues. He also explores how Big Sugar has flooded our diets with cheap sugar and marketing campaigns. By putting our world's current dilemmas about sugar production and consumption into a historical context, Bosma gives us new ways of thinking about sugar past and present.

Bosma is one of the leaders of the Commodity Frontiers Initiative, a network of scholars committed to studying the role of commodities in our world. Bosma has been a teacher and researcher in Paris, France, and Bonn, Germany, as well as the Netherlands. He has been awarded a major grant from the European Research Council to support commodities research. Bosma has appeared on BBC radio and been published in *TIME* magazine. He is currently Senior Researcher at the International Institute for Social History in Amsterdam and professor of International Comparative Social History at the Free University of Amsterdam. He has a PhD in history from the University of Leiden.

His Lecture

Drawing on his book, *The World of Sugar*, Bosma will discuss the earliest evidence of sugar production and explain how traders brought small quantities of precious white crystals to rajahs, emperors, and caliphs during the Middle Ages. Later, when European consumers discovered the sweet stuff, increasing demand spawned a brutal quest for supply based on enslaved labor. Two-thirds of the 12.5 million Africans taken across the Atlantic were destined for sugar plantations. By the 20th century, sugar had become a major source of calories in diets across Europe and North America. Sugar has been at the heart of capitalism, and this goes a long way in explaining why it poses such a threat to our bodies, our environment, and our communities.

9:45 a.m. Fifth Lecture

Jean Casimir, PhD
Professor of Humanities, Université d'État d'Haïti

Introduction

Anna Versluis, PhD
Professor of Environment, Geography, and Earth Science

Jean Casimir, PhD
Professor of Humanities,
Université d'État d'Haïti

Sweet Light from Sugar: The Counter-Plantation and the Trap of Imperial Discourse

Sugar, in the form of refined, added sugar, came into our collective lives through Europe's invention of the plantation. The plantation is a modern economic and social institution central to the West's project of industrialization, globalization, and racialization. It is a product of colonialism, and sugar cane is its preeminent crop. Through the wholesale abuse and forced labor of captive humans, tropical sugarcane was turned into a global commodity to be consumed by the West even as it consumed the bodies of indigenous people and captives kidnapped from Africa.

If Europe invented the racist, enslaving, destructive plantation that used forced labor to produce empty, addictive calories for export, what would its opposite look like? Jean Casimir says we can look to Haiti for an answer: The Haitian people have invented a counter-plantation. If we have ears to listen, Haiti can teach us a lot.

An author, teacher, researcher, and diplomat, Casimir is Professor of Humanities at the Université d'État d'Haïti and a renowned scholar of decolonization and historical sociology. He has served as Ambassador of Haiti to the United States, Permanent Representative to the Organization of American States, and as an international civil servant with the United Nations, and he has taught internationally at the Universidad Nacional Autónoma de México; Stanford University; Duke University; University of Utrecht; and University of the West Indies, Mona.

His numerous books, beginning with *La cultura oprimida*, seek to understand how a sovereign nation forms out of the hell that was the slave plantation. Published in Spanish, French, Haitian Creole, and English, his scholarship, while historical, becomes more relevant with each passing year by offering an analytical perspective to examine ongoing issues of racial injustice, the legacies of slavery, decolonization, and political sovereignty.

His awards include the Jean-Price Mars Award of the Faculty of Ethnology at the Université d'État d'Haïti and the Haitian Studies Association Award for Excellence. His most recent book, *The Haitians: A Decolonial History*, received the Frantz Fanon Outstanding Book Award from the Caribbean Philosophical Association.

His Lecture

Thought on Haiti is currently framed by ideas and values from the Modern Age not shared by its inhabitants. The emerging concept of statehood in the colonial "Pearl of the Antilles" institutionalized enslavement as a massive, if slow, execution of the workers. After centuries of stubborn resistance, the enslaved workers attempted, in 1791, to put an end to the slaughter. A counter-plantation system emerged, opposed to the avowed aims of modern public life. While the latter creates hierarchies of White, mixed-race, and Black people, Haitian Kreyòl spurns distinctions in skin color, differentiating only between foreigners, or Blan, and locals, or Nèg.

Though linked by power relations, French and Haitian Kreyòl speakers have been living two different realities. The incompatibility of these two realities and their unbearable hierarchy became increasingly apparent as Kreyòl speakers kept invading the public space. The resulting crisis remains insoluble within the framework of modern values. Life flourished out of a laborious search for dignity and sovereignty that the modern State cannot grant the descendants of the enslaved without destroying itself. Since they must solve their problems by themselves, Haitians will not enjoy the sweetness of sugar soon.

10:30 a.m. **Panel Discussion with Conference Speakers and Audience Q&A**

11:30 a.m. **Lunch**

See lunch options on page 21.

SESSION 4

12:15 p.m. **Musical Prelude**

Dr. Chad Winterfeldt
Cantor of Christ Chapel

Ballo del Granduca, SwWV 319	Jan Pieterszoon Sweelinck (1561–1621)
Selections from Pieces for Clavecin, Book 2	Elisabeth Jacquet de la Guerre (1666–1729)
Fugue in C major, BuxWV 174	Dietrich Buxtehude (ca. 1637–1707)

12:30 p.m. Sixth Lecture

C. Ford Runge, PhD
Distinguished McKnight University Professor of Applied Economics and Law, University of Minnesota

Introduction

Kathy Lund Dean, PhD
Board of Trustees Distinguished Professor of Leadership and Ethics and Professor of Management in Business and Economics

C. Ford Runge, PhD
Distinguished McKnight University Professor of Applied Economics and Law, University of Minnesota

The Economics of Processed Commodity Sugar: Molecules to Markets to Metabolism

If you think you've imagined that young people are drinking more sugar-based carbonated drinks, you're not dreaming. Called "sugar-sweetened beverages" or SSBs in research, the National Institutes of Health found that every day, more than a third of our young people (12 to 17-year-olds) consume one or two SSBs, and a third take in more than two. "Well," you think, "So what? Who doesn't love an icy soda as a pick-me-up?" Research has consistently found that our bodies do not love it. The Center for Disease Control routinely finds that youth SSB consumption contributes to a gamut of persistently poor health outcomes: obesity, Type 2 diabetes, heart disease, non-alcohol-related liver disease, tooth decay with cavities, and a form of arthritis called gout. Although these health outcomes disproportionately burden all youth, such impacts are concentrated disproportionately among non-Hispanic Black youth and across lower socioeconomic sectors; these are clear signs that lowering SSB consumption has an urgent ethical imperative.

One impactful research effort toward lowering and reversing youth SSB consumption comes from economics: How much are you willing to shell out for your mid-afternoon jolt of caffeine and sugar? What if you knew that the beverage was being heavily taxed as a way to offset the negative health effects of SSBs? Can we use incentives and disincentives—those ubiquitous economic levers—to change consumption patterns?

Economist C. Ford Runge and a multidisciplinary group of researchers thought so. Their research suggested you'll be less likely to buy that SSB if you're told that the rise in price is linked to a health-related aim, such as offsetting healthcare costs, than if you're given no reason for the rise. Specifically, messaging that your price increase helps protect kids and helps lower obesity rates contributed to lower SSB purchases.

The paper is one example of Runge's research on the ways in which incentives and disincentives can affect our buying and consuming behaviors. This set of findings suggests that hitting us in the wallet, when we know it's for our own good, can encourage us to reconsider our relationship to sugary drinks and change our buying behavior.

For much of his career, Runge has studied food and agriculture, examining population-level or policy-level impacts on consumption, health, and hunger. One recent strand of that work examines the impact of food policy on particular populations, of which the sweetened beverage study is one example. An earlier body of research examined the "food versus fuel" debate that arose in response to the move to create ethanol from cellulosic plants such as corn and sugarcane. An often-cited 2008 paper in Foreign Affairs magazine was titled "How Biofuels Could Starve the Poor." A third strand of food-related research has focused on food insecurity.

The throughline across Runge's research is an interrogation of policies' everyday impacts on consumers, particularly those who are vulnerable or traditionally marginalized. Whether the topic is agricultural policy, dispersion and labeling of genetically-modified organisms in our food, or climate implications for global food production, Runge asks the big questions in his research.

Runge is the recipient of both Rhodes and Fulbright fellowships. He is a member of the Council on Foreign Relations. Runge is the Distinguished McKnight University Professor of Applied Economics and Law at the University of Minnesota. He earned his PhD in economics from the University of Wisconsin.

His Lecture

Cane sugar is an ancient commodity, but its global reach and impact are only a few centuries old. This impact has been profound and complex. Its supply has propelled forces of colonization, slavery, and commercial trade in complementary goods such as tea, coffee, and cocoa. Its cultivation has led to ecological and social destruction, and protectionist regimes to subsidize and protect domestic markets. It has encouraged the conversion of beets and maize to produce other sugars. The demand for sugar sweeteners has been a major force in the global spread of obesity and diabetes.

1:15 p.m. Seventh Lecture

En-Ming Hsu
Gold Medalist, Coupe du Monde de la Patisserie

Introduction **Janie Frandsen, PhD**
Arthur Glass, Charles Hamrum, Arne Langsjoen Professor of Biochemistry in Biochemistry and Molecular Biology and Assistant Professor in Chemistry and Biology

En-Ming Hsu
Gold Medalist, Coupe du Monde de la Patisserie

Sugar in the Hands of the Modern Pastry Chef

When we think about sugar, we often think of sweet treats like candies, cookies, and cakes. If you enjoy baking, you might have even searched for a butter cake recipe and encountered one of En-Ming Hsu's recipes. For Hsu, sugar is not just an ingredient. It is an art medium. Whether shaped into showpieces or baked into pastries, sugar is at the core of everything she creates.

Hsu credits the design and presentation of her desserts to her training in studio arts at Skidmore College. She later pursued formal training in pastry at the Culinary Institute of America in Hyde Park, New York. She then used her skills and creativity at some of the most renowned hotels and restaurants in America, including The Ritz-Carlton, Chicago, where she held the position of Executive Pastry Chef.

Today, Hsu continues to use sugar to create desserts that people all over the world can enjoy, often drawing inspiration for her creations at local farmers' markets. As a pastry consultant, she creates recipes for pastry product manufacturers. During the pandemic, she partnered with her sister, Yih-Ming, to launch Sip!, a company offering a nutrient-rich chocolate drink mix.

In addition to consulting and running a business, Hsu also shares her expertise as a guest chef at culinary educational institutions including the King Arthur Baking Education Center and The French Pastry School. She also has served as a jury member for competitions like the World Pastry Team Championship, where she evaluates the creativity and technical skills of others using sugar.

Hsu's skills have earned her several awards, including the Amoretti World Pastry Team Championship "Pastry Chef of the Year" award in 2010, one of the highest honors in the pastry world. She was team captain of the first and only United States pastry team to capture the gold medal at the Coupe du Monde de la Pâtisserie (Pastry World Cup) in Lyon, France. Her work has been published by leading baking and pastry magazines, as well as several recent books on baking and pastry.

Hsu has transformed what most people think of as a simple ingredient into a form of art. From stunning sugar showpieces to classic European and American pastries, and now to luxurious chocolate mixes, she continues to redefine what is possible with sugar.

Her Lecture

If we trace sugar back to colonial times, we see the beginnings of an industry that stealthily wove its way into our daily lives until it grew to permeate nearly every aspect of our diet. Is there no going back? Pastry chefs have the choice to continue feeding the cravings or influence a change in attitude, one that is deeply rooted in our culture. Let's dive into the pastry chef's role and view how chefs understand and work with sugar. Sugar is at the core of what pastry chefs do; we manipulate sugar to create stunning works of visual art and edible treats that provide comfort, happiness, and a sense of community. Modern pastry chefs recognize cultural shifts and more are focusing on health-conscious consumers. Psychological and physiological adjustments can be made to gradually rewire our brains to enjoy sweets with less detriment to our bodies.

2 p.m. Panel Discussion with Conference Speakers and Audience Q&A

2:45 p.m. Nobel Conference 61 Closing Remarks

EXPLORE ADDITIONAL OPPORTUNITIES ON CAMPUS

Many places on the Gustavus campus will be open to guests during the conference. Take the opportunity to visit one or more of them during the lunch break or following the day's lectures. A campus map can be found on page 30.

GEOLOGY MUSEUM

Visit the Chester Johnson Geology Museum in the lower level Nobel Hall of Science inside the north entrance.

HILLSTROM MUSEUM OF ART EXHIBITION: *FARM TO FRAME*

Hillstrom Museum of Art, Lower Level, Jackson Campus Center

Farm to Frame traces sweet and unsavory connections between food, labor, culture, craft, and community. Explore the often invisible processes of food production and preparation through a Cup'ik fishing basket or a Swedish hand-crank coffee mill. This exhibition invites you to indulge your senses through interactive dioramas and more than 100 objects spanning five continents, from hand-carved utensils to still life paintings.

SCHAEFER GALLERY EXHIBITION: *STRANGENESS SHOULD FLOW LIKE SUGAR*

Schaefer Fine Arts Center, Studio Arts Building (FAA)

Anda Tanaka presents an exhibition of intaglio prints using the Sugar Lift process. This process involves a sugar-based solution to create a design on an etching plate, which is then coated with an acid-resistant ground. When the plate is submerged in warm water, the sugar dissolves, lifting away the ground and exposing the metal beneath, allowing for etching.

GUSTAVUS ARBORETUM

Take a self-guided walk through Minnesota's biomes in the Gustavus Arboretum on the south end of campus. Open until dusk.

SCULPTURES

Take a self-guided tour of the Granlund sculptures on the Gustavus campus. Pick up the brochure at the Nobel Conference Information Desk near the entrance to the Chapel.

HIGH SCHOOL STUDENTS

Welcome high school students. Find out what role Gustavus might have in your future as a student. Stop by the Admission Office in the Campus Center or learn more online at **gustavus.edu/admission-aid**.

BOOK MARK (campus bookstore)

Nobel Conference speakers' books/videos/products along with Conference t-shirts will be available along with other books, gifts, cards, clothing and supplies. Stop by the lower level of Jackson Campus Center on Tuesday and Wednesday from 8 a.m. to 5 p.m.

INFORMATION

INFORMATION & MESSAGE CENTER

Located in the lobby of Christ Chapel, the Nobel Conference Information Desk may be reached during Conference sessions by calling (507) 933-7520.

AUDIENCE QUESTIONS

Panel discussions including your questions are always a highlight of the Conference.

Questions may be submitted in the following forms:

- Email to **nobelconference@gustavus.edu**
- If you're in Christ Chapel, submit them in writing to one of the ushers

We are only able to use a few of your always-interesting questions. Please take the opportunity to discuss them with other Conference attendees or leave a comment on one of the Nobel Conference social media accounts.

ACCESSIBILITY ASSISTANCE

Christ Chapel is wheelchair accessible. A limited supply of hearing assistance units will be available during the Conference on a first-come, first-served basis. They can be checked out at the information desk in Christ Chapel. Open-captioning services is a text display of words spoken during the lecture and is happening during the Conference.

RESTROOMS

Restrooms are on both levels of Christ Chapel as well as in Nobel Hall of Science and Jackson Campus Center. Gender-neutral restrooms are on the upper level of the Jackson Campus Center near the Presidents Dining Room.

MULTIFAITH SPACE

The Bonnier Multifaith Center is available for personal prayer, meditation, or reflection during the Nobel Conference. It is located at the south end of Anderson Hall on the main floor.

CERTIFICATION OF ATTENDANCE

Certificates of attendance for continuing education credits are available at the Nobel Conference Information Desk.

SOCIAL MEDIA

Follow the Nobel Conference on Facebook and Instagram.

FOOD AND BEVERAGES

The following options are available for lunch or snacks.

The Gustavus Market Place is the main College dining room, located in the upper level of the Jackson Campus Center. Food is available for purchase ala carte.

Courtyard Café and the STEAMery: The Courtyard Cafe is located on the lower level of the Jackson Campus Center, and the STEAMery is in the Nobel Hall of Science, near Anderson Theatre. Both are open during the Conference and serve coffee, pastries, sandwiches, soups, and snacks.

Bring Your Own Lunch: Tables are available in the Campus Center banquet rooms for those who wish to bring their own lunch.

No pre-ordered lunches are available.

ZERO-WASTE CONFERENCE

We aim to make the Nobel Conference a zero-waste event. Whenever possible, we will use compostable, recyclable, or reusable materials. Please help the effort by selecting the appropriate bins in which to dispose of items you no longer need.

WEB ARCHIVES

Nobel Conference lectures and panel discussions will be archived on the Gustavus website at **gustavus.edu/nobelconference**. Archived lectures provide you a snapshot history of some of the important scientific developments of the past 60 years.

Understanding Sugar: A Glossary of

WHAT IS SUGAR?

The word “sugar” comes from ancient Persian and Sanskrit words “Shakar” and “shakara.” While we often think of sugar as the white crystals we add to coffee, the reality is far more complex and fascinating. Sugar is an umbrella term for a wide range of sweet-tasting, energy-producing substances. Furthermore, to a chemist, a sugar is any member of a broad class of **carbohydrates** composed of carbon, hydrogen, and oxygen. While that definition includes the sweet substances we ordinarily think of, it also includes some very large molecules that are not sweet and are not food.

NATURAL SUGARS: THE BUILDING BLOCKS OF ENERGY

Glucose serves as the primary fuel for all living things. It’s the sugar that circulates in your bloodstream, and doctors measure glucose levels to diagnose conditions like diabetes. Glucose is a monosaccharide, meaning it is made up of one sugar “unit.”

COMMON NATURAL SUGARS

- **Fructose** - The natural sugar found in fruits; a monosaccharide
- **Sucrose** - Regular table sugar, extracted from sugar cane or sugar beets. Sucrose is a “disaccharide” because it is made of molecules of fructose and glucose bonded together.
- **Lactose** - The sugar present in milk and dairy products; a disaccharide
- **Maltose** - Found in malted grains and brewing processes; a disaccharide

NATURAL SUGAR SOURCES

These natural sugar molecules can be found in a variety of natural sources, each with its own unique composition and flavor profile.

- **Honey** - A complex mixture primarily containing glucose and fructose
- **Maple syrup** - Concentrated tree sap with natural sugars and minerals
- **Agave nectar** - Extracted from the agave plant, high in fructose
- **Coconut sugar** - Made from coconut palm sap
- **Date sugar** - Ground whole dates, retaining fiber and nutrients

When sugar cane or beets are processed, byproducts like molasses and brown sugar are produced. Less refined options like turbinado and demerara sugar retain traces of molasses, giving them their distinctive color and’subtle flavor. These were actually among humanity's earliest forms of candy.

THE SWEETNESS DECEPTION

Our taste buds don’t tell the whole story about sugar content. Many carbohydrates and even proteins contain glucose but don't taste sweet at all. This explains why meat and potatoes can brown and “caramelize” when heated—they contain sugars we can’t taste.

The **glycemic index** measures how quickly foods raise blood glucose levels compared to pure glucose. Low-glycemic foods like celery or broccoli won’t taste sweet and cause minimal insulin response, while naturally sweet foods like ripe plums or apples score higher and trigger stronger insulin reactions.

Sugar-Related Terms

SUGAR ALTERNATIVES

Sugar Alcohols

These compounds taste sweet but behave more like vegetables in your body. Sugar alcohols such as xylitol, erythritol, sorbitol, and mannitol have chemical structures resembling both sugar and alcohol (though they contain no ethanol and won't intoxicate you). They provide few calories, have low glycemic index scores, and don't trigger the same insulin response as regular sugar.

Artificial Sweeteners

These are synthetic compounds designed to provide intense sweetness without calories. They're typically much sweeter than sugar, so only tiny amounts are needed. Common examples include:

- **Aspartame** (Equal, NutraSweet)
- **Sucralose** (Splenda)
- **Saccharin** (Sweet'N Low)
- **Acesulfame potassium** (Ace-K)
- **Neotame** (Newtame)

Unlike natural sugars, artificial sweeteners cannot be metabolized for energy. Instead, they pass through your digestive system largely unchanged and are eliminated within 24 to 48 hours.

HIDDEN SUGARS IN OUR DIET

Even when avoiding obvious sweets like candy and pastries, sugar finds its way into our diets through processed foods. **High-fructose corn syrup**—a mixture of glucose and fructose—appears in countless processed foods, beverages, and condiments, often where you'd least expect it.

GLYCANS: SUGAR'S COMPLEX MEMBERS

While dietary sugars provide energy and sweetness, there's an entirely different world of sugar molecules called **glycans** that serve fundamental biological functions. These complex carbohydrate structures represent one of the four major classes of biological molecules, alongside proteins, lipids, and nucleic acids.

HOW GLYCANS DIFFER FROM DIETARY SUGARS

Glycans are built from monosaccharides but are connected into complex structures—either linear chains or branched, tree-like formations. Glycans are sugars in the chemical sense, not the dietary sense.

CRITICAL FUNCTIONS OF GLYCANS

Structural Support: Glycans provide the backbone for plant cell walls and arthropod exoskeletons, giving these organisms their shape and strength.

Energy Storage: Plants store energy as starch (a glycan), while animals use glycogen. Both are far more complex than simple dietary sugars.

Cellular Communication: On cell surfaces, glycans act like molecular ID cards, helping cells recognize each other and communicate effectively.

Biological Processes: Glycans are essential for immune system function, determine blood types, and play crucial roles in many disease processes.

The incredible complexity and diversity of glycan structures make them extraordinarily information-rich molecules. Scientists often call them the "third alphabet of life" after DNA and proteins. The field studying these molecules—glycobiology—continues to reveal new insights into health, disease, and the fundamental processes of life. Understanding this distinction helps clarify why sugar is both simple and complex: The sugars we eat provide quick energy, while the glycan sugars in our bodies serve as the sophisticated molecular machinery that keeps life functioning.

BRINGING THE CLASSROOM TO LIFE

At Gustavus, every student completes at least one **Signature Experience**. SigX is a financially supported, personalized, and customizable experience that connects Gustavus liberal arts to your **Next Big Thing** after college. You'll partner with faculty members who mentor you toward your future goals—and prepare you to tell your SigX story to potential employers and graduate schools.

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Find out what role Gustavus might have in your future as a student. Stop by the Admission Office in the Campus Center or go to **gustavus.edu/admission-aid** to learn more.

9 FULBRIGHT AWARDS
In the 2023–2024 academic year, Gustavus was named one of 32 national Top Producing Fulbright Institutions

TOP 20 for Best College for **WOMEN IN STEM**
(Washington Monthly)

#1 in Minnesota for **TOP PERFORMERS** on **SOCIAL MOBILITY**
(U.S. News and World Report)

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The Mississippi: Sacred Waters, Life-giving Stories

GUS GOES THERE

Gus Goes There is an educational video series that puts scientific discovery in conversation with ethical inquiry, and is designed for middle and high school students. With "Gus" the Lion serving as tour guide, each episode explores how thinking about a particular scientific issue has evolved over time. Using footage from more than 60 years of Nobel Conference lectures, the series invites students to think critically about the ways science changes in light of new evidence, new technology and new ways of thinking about the world and our place in it. *Gus Goes There* is challenging students to grapple with the complex intersection of science and technology.

Each five-minute episode is accompanied by a teacher's guide that includes central concepts and discussion questions, designed to support Minnesota Department of Education science standards.

Episodes include

Climate: *People and Planet*

Genetics: *Humans and DNA*

To Be Human: *What Sets Us Apart*

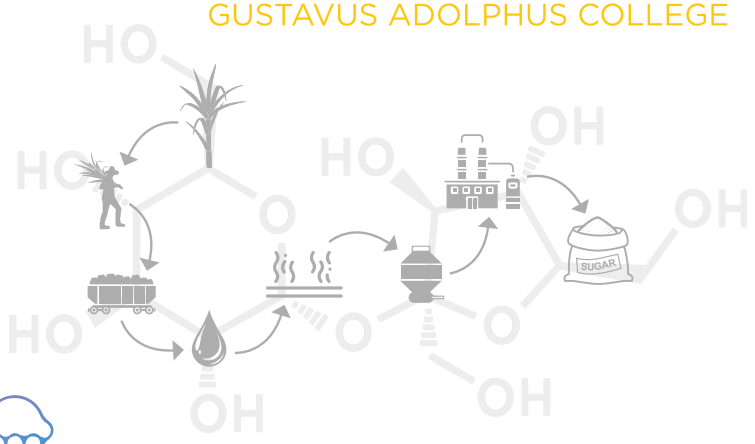
Scan here to watch the videos!

GUSTAVUS ADOLPHUS COLLEGE

SUGAR

Bringing Sweetness to Light

OCTOBER 7 & 8, 2025
GUSTAVUS ADOLPHUS COLLEGE



THE NOBEL CONFERENCE
GUSTAVUS ADOLPHUS COLLEGE

2025 NOBEL CONFERENCE

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Portions of this program were prepared with the assistance of artificial intelligence technology.

ABOUT THE NOBEL 61 ARTWORK

This year's poster design, Nobel Conference 61: *Sugar; Bringing Sweetness to Life* was designed by Jenny Kurth. Here's what she says about the artwork: *For many, sugar sparks memories of childhood, celebrations, rewards, and fun. I wanted the poster to capture that sense of energy and vibrancy while also showing that sugar in our food isn't always obvious. It can be hidden in vegetables, fruits, beverages, and even condiments. It also carries cultural and historical significance in how it's been produced and consumed, which I hope will be an opportunity to pause, reflect, and explore sugar in a new light.*

NOBEL CONFERENCE 2026

THE MIGHTY MISSISSIPPI: CURRENTS OF CHANGE

If the continent of North America contains a beating heart, it is the Mighty Mississippi, pulsing with life and meaning. It can separate or connect us, submerge or buoy networks of life. Countless stories are told and retold about this river, its abundant tributaries, and the land from which its waters emerge. And yet, how well do we really know our own heart? On maps, the Mississippi is merely what lies between two banks. In actuality, the Mississippi River Basin represents a dynamic intersection of geological forces, biological communities, ecological systems, and human cultures. Nobel Conference 62 brings together scientists, historians, Indigenous knowledge keepers, artists, students, and members of the public to expand our perspectives on this vast watershed. Together, we will engage empirical, historical, and Indigenous perspectives to better know it, metaphysically and ecologically. We will explore how the river has evolved through time. Finally, we will honor it by examining how the confluence of climate change, agricultural runoff, river engineering, and changing communities pose challenges to the future health of the river and those who depend upon it.

OLLEGE

ICE 62

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CONFIRMED SPEAKERS

Kelly Applegate, *Commissioner of Natural Resources for the Mille Lacs Band of Ojibwe*

Solomon David, *Fisheries, Wildlife and Conservation Biology, University of Minnesota*

Nick Estes, *American-Indian Studies, University of Minnesota*

Ehab Meselhe, *River-Coastal Science and Engineering, Tulane University*

Lisa Shulte Moore, *Natural Resource Ecology and Management, Iowa State University*

Nicholas Pinter, *Center for Watershed Sciences, University of California-Davis*

Beverly Wright, *The Deep South Center for Environmental Justice*

NOBEL CONFERENCE SPONSORS

Adeline and Drell Bernhardson

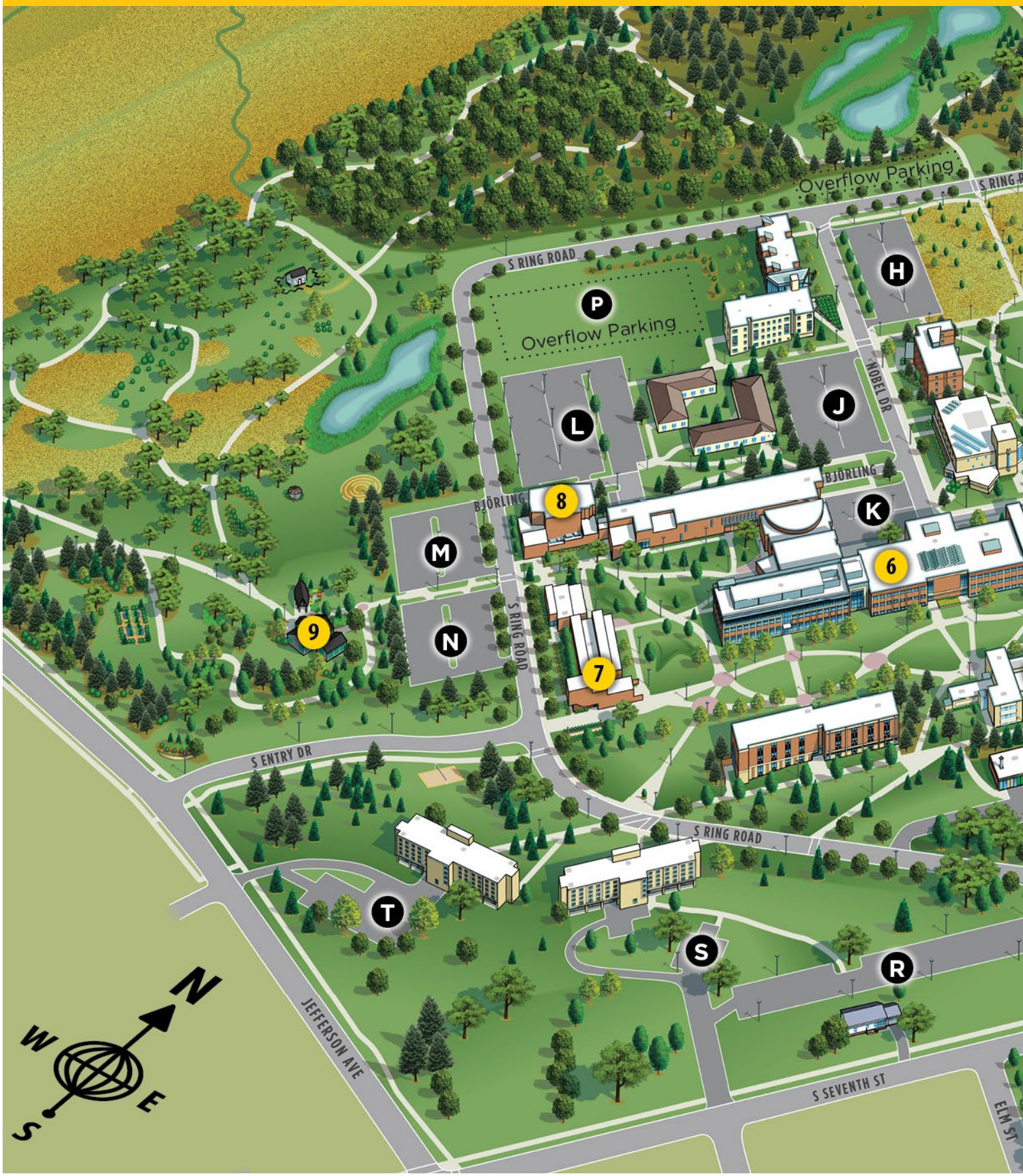
The Nobel Conference is the only education conference in the United States to be authorized by the Nobel Foundation in Stockholm, Sweden. Core endowment funding for the conference was permanently secured through the generosity of the late Reverend Drell and Adeline Bernhardson. The Bernhardsons recognized and celebrated the historic relationship between the Nobel Foundation and Gustavus Adolphus College. By establishing this endowment, they secured the core funding for the success of the conference and established a platform on which the conference can expand its reach and impact. Other core funders to the Nobel Conference include Dawn Ekstrom Michael '67 and Ted Michael, the late Russell and Rhoda Lund, the RJ Foundation and Steve Sether. The generosity of these donors will ensure new generations of high school students, the Gustavus community, and avid and longtime Nobel Conference attendees can enjoy this renowned academic conference.

The Nobel Conference represents the very best of liberal arts education, bringing together rigorous scholarship, intellectual curiosity, and meaningful dialogue. Your support helps ensure that this remarkable tradition can continue to be provided free of charge. To make a financial contribution to the Nobel Conference endowment, please visit **gustavus.edu/give.**

Thank you to Heroic Productions for providing the sound, lighting, camera equipment, and staff to support the Nobel Conference.

Heroic Productions

CAMPUS MAP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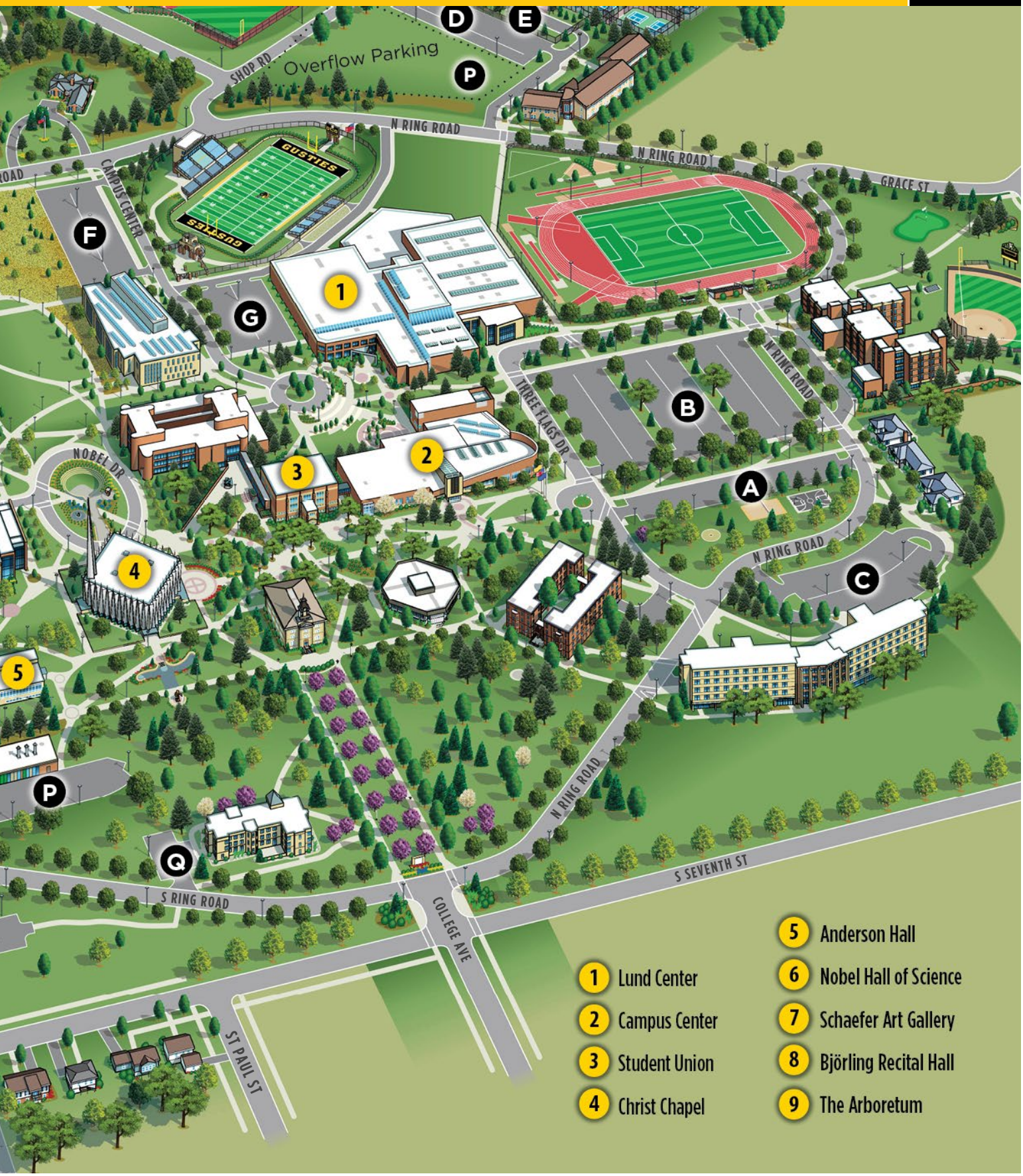
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NOBEL DR
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COLLEGE AVE
S SEVENTH ST
ST PAUL ST
1 Lund Center
2 Campus Center
3 Student Union
4 Christ Chapel
5 Anderson Hall
6 Nobel Hall of Science
7 Schaefer Art Gallery
8 Björling Recital Hall
9 The Arboretum

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