Working Draft

Wine Cipher & Cyber: Decoding the Language of Wine

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"What's in a name? That which we call a rose, by any other word would smell as sweet;"
William Shakespeare

Abstract

Modern wine language is a cipher that was primarily set forth by the Wine & Spirts Education Trust and the Court of Master Sommeliers in the 1950-1960's in England. It is a common misconception that this jargon is random, subjective, and vague, when in fact, it is highly codified. The cipher primarily employs metaphor and simile to convey meaning by inferring that one thing resembles another. It is a standardized language that has been adopted by every wine producing region in the world. Wine professionals, writers, critics, and marketers needed a common vernacular in which to communicate with each other and consumers. Wine cipher evolved and improved over the last seventy years as regional wine culture adjusted to the swift globalization of the wine industry, and adaptations to emerging disciplines like flavor chemistry and professional wine education. My paper will explore this wine cipher and aims to decode this mysterious language. In addition, I will look at modern cyber software technology designed to decode or circumvent wine cipher all together.

Key Words
Language, cipher, vocabulary, metaphor, simile, grape varietal, phenolics, tasting notes, flavor chemistry, representation, hedonist, wine apps (cyber applications).

Developing Modern Wine Cipher

Wine cipher evolved and adapted over the last seven decades due to the influence of regional developments in wine culture, globalization of the wine industry, and the influence of emerging disciplines like flavor chemistry, neuroscience, neuroenology, and systematic professional wine education. Wine cipher is an insider's wine-industry language based on metaphorical references to fruits, vegetables, flowers, and other organic and inorganic materials perceived in the aroma and taste of a given wine. This language, actually dates back centuries to French and Italian Catholic monasteries, and is derived from "in the glass" experiments in nosing and tasting wine to determine not just quality and viability, but also typical, varietally correct tasting (smell/taste) notes for a given grape varietal or blend of

grape varietals. Much of this work was done to establish systems of legal standards, optimal vineyard and vinification practices, and to stave off rampant fraudulent commercial activities.

In the past three decades, modern wine language has been expanding with the rise of the celebrity wine sommelier, writer and /or critic, along with established systematic wine education methodology. Prominent modern wine cipher contributors include highly influential wine critic, Robert Parker, Jr., chef and molecular scientist, François Chartier (*Taste Buds & Molecules*), oenologist, inventor, and author, Jean Lenoir (*Le Nez du Vin)*[1], and the first non-industry Master of Wine, Jancis Robinson (*Wine Grapes: A Complete Guide to 1,368 Vine Varieties, Including Their Origins and Flavours / The Oxford Companion to Wine)*. Among these terminology influencers, each participated in the aforementioned professional wine education programs through the Wine & Spirits Education Trust before developing their wine industry careers. This code of metaphorical ideas as wine language, however, can be problematic, due to a gap between what professionals say and what consumers hear, as explored by Master of Wine, Dr. Steve Charters and Dr. Simone Pettigrew in their recent study about the effectiveness of wine communication between professionals and novices. (Charters:2006)[i].

Is that a Lychee in Your Glass?

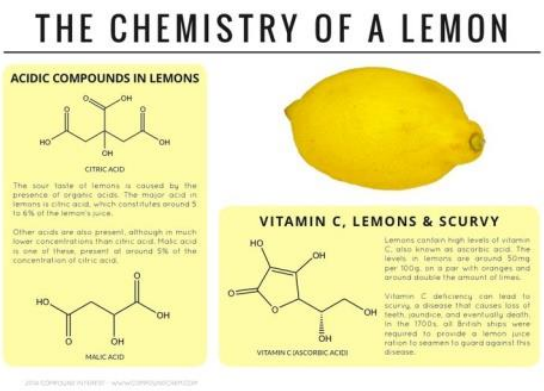
Human beings in optimal physical condition "have 350 olfactory receptors and can smell 10,000 different volatile aroma molecules."[ii] A healthy olfactory mechanism, environment, and weather, all affect the mobility of these molecules (Chartier & Reiss: 2012). The brains of wine tasters categorize these volatile aroma molecules as odors based on previous experiences with the same or similar volatile molecules and must work with (their) established vocabulary to categorize these sensations into a logical syntax in order to be understood. New aromas require new vocabulary associations in order to create a new categorical reference points for future access. (Spinner: 2014). Without these vocabulary associations, these new sensations

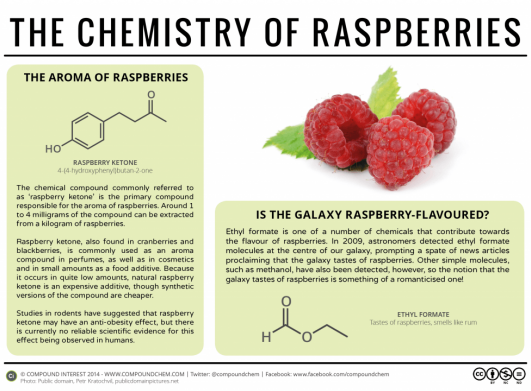
[1] According to his website (www.lenez.com/fr/editions-jean-lenoir/concept) Jean Lenoir is a technician-oenologist, taster and publisher, most notably for the box-books Le Nez du Vin (1983); The Nose of Mushrooms, with Marcel Locquin (1986); and The Nose of Herbs and Spices (1987). In 1976 the Nez du Vin, a formidable box of aromas, turned the tasting world upside down. Le Nez du Vin is an encyclopedic box: "six rows of nine bottles, it will be 54" including the most universal and typical aroma notes for table and sparkling wines. In 1981, he created his company and ordered a thousand boxes, selling out in three months. Producers like Henry Marionnet, the very first customer, quickly understand the interest of the object. Maison Moët & Chandon ordered 2,000 boxes at once for its internal training sessions. From 1982, the box is translated into English and in 1983, into German and Italian. The first offering in 1982 was a small box of twelve flavors for red wines, intended for business gifts, and has since evolved into the encyclopedia of 54, a champagne kit, wine faults kit, post-fermentation aging kit, beer kit, coffee kit, whiskey kit, and a chocolate kit.[1](I have one and it is fantastic).

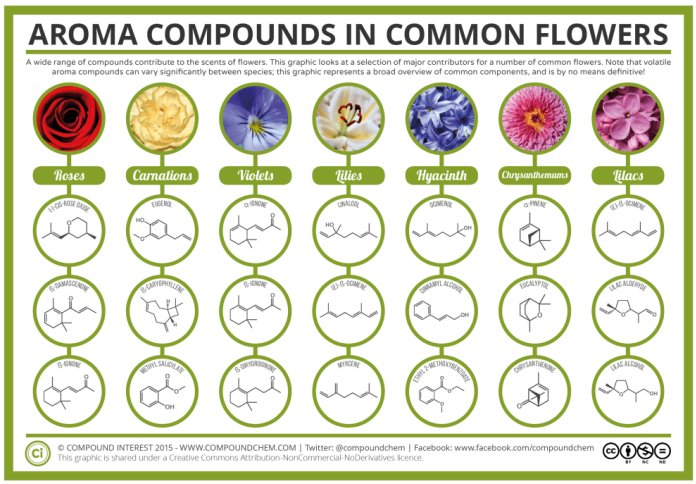
are simply ignored by the brain. If a wine tasting note for the grape varietal called gewürztraminer lists, for example, lemon chiffon, white flowers, ripe white peach, cloves, and lychee fruit, and the taster has never experienced lychee fruit[2], then that note is useless to them as it is unidentifiable. "White flowers" is a frequently used wine tasting note that is general and easily misinterpreted: gardenias, freesia, carnations, roses, lilacs, magnolia, and orchids all come in hues of white and all smell vastly different from one another (see figure 3 below). Molecularly, these tasting notes are abstractions of the actual volatile molecules attached to them. Rather than labeling the tasting note molecule 714 raspberry ketone, non-scientists simply call the note raspberry or, rather than referring to an off-flavor known as terpene by its chemical code, we call it green bell pepper. Organic chemist, Andrew Brunning of the University of Cambridge is developing infographics featuring molecular maps of various aromas ranging from the aromas in food and wine to the aromas of the sea, rain, flowers, herbs, Christmas trees, and even humans. The infographics presented here (figures 1-5 below) illustrate the molecular maps of raspberries, lemon, and various flowers, all of which are common wine aroma notes. Also included are representations of red wine and champagne to illustrate the increasing complexity of their volatile aroma molecular structure which are compound molecules known as known as phenolics.

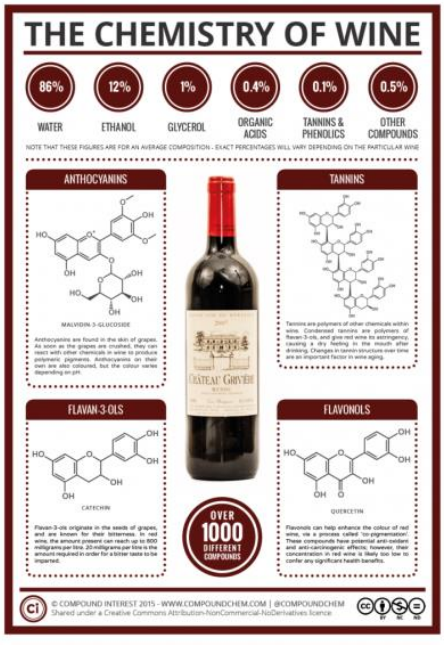
[2] Before wide spread globalization, wine vocabulary was unique to each region, a person in Germany or France may not have ever experienced Asian lychee fruit even though it is one of the most common descriptors of the gewürztraminer varietal common to the region. Older descriptors termed this note "perfumed" or "cold cream" and denoting the perfume or scents of an older woman of an earlier era—in wine slang, 'your grandmother's vanity.' There was simply no point of reference for lychee fruit. Before lychee fruit became widely accessible due to advances in food preservation and a global market economy, the descriptor didn't exist. Wine vocabulary is evolving with globalization and lychee has replace cold cream to describe this very unique note in the gewürztraminer varietal. The lychee note is actually based in science. (Spinner: 2014). According to Peter Ong and Terry Acree, researchers in flavor chemistry, an analysis of the gewürztraminer varietal and canned lychees indicated that the chemical molecules cis-rose oxide, linalool, ethyl isohexanoate, geraniol, furaneol, vanillin, (E)-2-nonenal, β-damascenone, isovaleric acid, and (E)-furan linalool oxide were the most odor potent compounds detected in the wine and fruit extracts." (Spinner: 2014| 2Ong, Peter K.C., and Terry E. Acree. "Similarities in the Aroma Chemistry of Gewürztraminer Variety Wines and Lychee (Litchi Chinesis Sonn.) Fruit." Journal of Agricultural and Food Chemistry 47.2 (1999): 665-70. Web.).

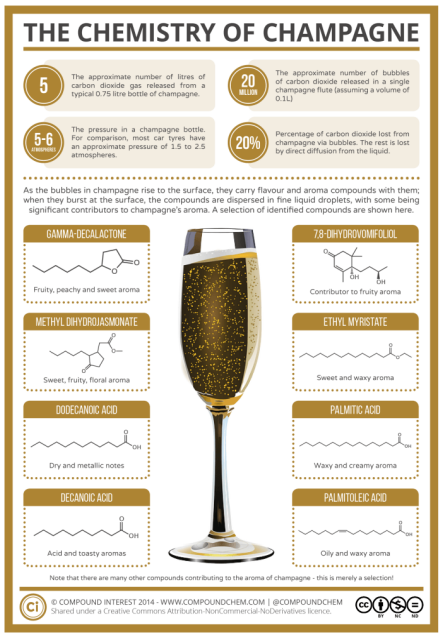
Figures 1-5 Various Molecular Images & Descriptors







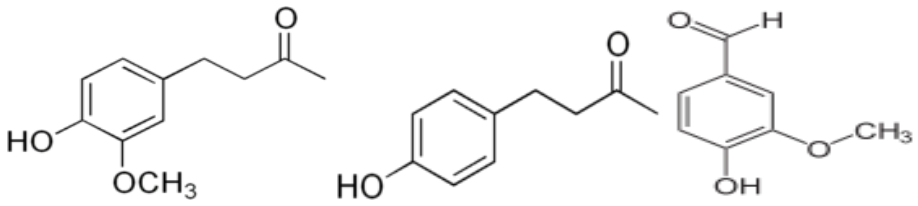




Molecules and their metaphoric language associations

According to world-renowned UC Davis Enology Program wine science expert, Dr. Susan Eberler, the basic components in grape must (pressed grapes and juice) consists of seventy-nine percent water and twenty percent carbohydrates, with just one percent organic acids including trace amounts of glycerol, tannins, phenolics, vitamins, minerals and nitrogenous compounds. The sugars, organic acids and phenolics give the juice its flavor and texture, while the vitamins, minerals and nitrogenous compounds are, in many cases, essential to yeast growth and fermentation. Post fermentation, wine has a similar chemical composition, but has much lower levels of sugar (none in dry wines) which has been converted into alcohol (8 - 17% alcohol) and a greater range of minor components and phenolics created as a by-product of the fermentation process. (Eberler: 2017) Although phenolics make up less than one percent of a wine's composition, wine can have as many as 300-500 different phenolics (volatile aroma molecules), making it one of the most complex food objects: in contrast, bananas have four volatile aroma molecules arranged together to create the signature banana flavor. (Spinner: 2016).

Figure 6: Molecules and Proper Names



Zingerone / Spice *Raspberry Ketone* *Vanillin*

As previously mentioned, wine experts train with a codified language of vocabulary associations that are largely based on metaphor and simile: for example, (this) wine tastes like cherries, raspberries, black plums, vanilla, spice, and smoke: the classic tasting note for Spanish Rioja made from the tempranillo varietal. Dr. Frédéric Brochet and the late enology professor, Dr. Denis Dubordieu collaborated multiple times in efforts to explore and refine this wine language and the cognitive sensory processes involved in identifying and categorizing various aromas and tastes in wine. In their article *Wine Descriptive Language*

Supports Cognitive Specificity of Chemical Sense, Brochet and Dubordieu illustrate the step by step process of wine analysis.

> Wine is one of the more often described foods, and wine literature is widespread with numerous journals, books, and reviews being presented to the public and experts or professionals. People who fail in describing wine flavors, i.e., who cannot speak about its taste in a professional manner, usually consider themselves as ‘‘not knowing anything about wine.’’ A question can then be posed as to whether this means that knowledge requires language. Winemakers, professional critics, enologists, and amateurs have built a wine language or vocabulary that they use to describe sensory properties of wine. They use it to exchange sensory data among themselves and to analyze their information for other uses, for example, to determine the way that wine should be managed in the future to acquire a specific taste…Although many efforts have been made to characterize the quality and flavor of the compounds in wine by gas chromatography and other chemical techniques, tasting remains the single universal test used to properly assess wine sensory properties. This is because the taste of a molecule, or of a blend of molecules, is constructed within the brain of a taster. It is a complex recognition of different properties which integrates many aspects of the sensory faculties of an individual. Such information is not contained entirely in the physicochemical structure of the complex molecular structure of a wine taste. For example, it is known that the perceived flavor of a blend of two molecules is rarely the combination of the two flavors but usually a third flavor which is not predictable from the two initial ones. (Frédéric Brochet and Denis Dubordieu)[iv]

Through their work, Brochet and Dubordieu illustrate the uniqueness and complexity of wine cipher as a means for “exchanging sensory data” to convey quality and flavor profiles of specific wines.

The olfactory system is directly linked to the brain’s prefrontal cortex via nerve endings that reach through the microscopic perforations in the cribriform plate separating the brain from the olfactory bulb. These nerve pathways reach into the limbic center of the brain, a center thought to be responsible for human memory, emotions, a sense of well-being, and even happiness (Drummond: 2015). The olfactory receptors recognize the volatile aroma molecular stimuli responsible for triggering their neural pathways to code and categorize flavor identifiers as vocabulary associated references, resulting in an ability to engage in the aesthetic valuation and aesthetic experience of tasting and enjoying a glass of beautifully balanced wine (Spinner: 2016). The brain depends on individual and group sensory stimulation and analysis in order to formulate a specific sense of order or signature derived from the sensory stimuli in the form of volatile aroma molecules (Chartier & Reiss: 2012). Once the brain designs this signature, the sensation is deposited into a preassigned category, for example cherry, which has a specific vocabulary association based upon previous exposure to the that category and object. (Shepherd: 2017)[v] Once the taster has experienced cherry (for example) their brain can almost instantly recategorize similar/same volatile aroma

molecules and code them as cherry. Slight variations may still be categorized as cherry, for example: black cherry, pie cherry, Morello cherry, Luxardo maraschino cherry, cherry flavoring (chemicalized), cherry cough syrup, and even cherry cola all share a common base note while varying greatly (Spinner: 2014). These categories hold ideas of objects and are simply representations or forms of an idealized object (Plato: Meno, c. 380-360 B.C.E., pg. 71-81)[vi] as a reference point, which are then conveyed through metaphorical language (Shepherd: 2017).

The Problem of Wine Cipher Coded Language

It is a common misconception that wine cipher is mysterious, subjective, and vague, when in fact; it is highly codified and easily learnable. The modern wine language discussed here was set forth, as mentioned, by the Wine & Spirts Education Trust and the Court of Master Sommeliers in the 1950-1960's in England. These organizations developed metaphorical language and lexical patterns along with standards and methodology centered on the use of rigorous and frequent tasting analysis based on a model of varietal typicity. Since few people outside of the wine industry have the inclination, time, resources, or reason to devote themselves to professional wine education as personal development, the divide between consumer and professional continues to grow. The advances made by the professional wine academy in codifying wine cipher continue to alienate the novice or enthusiast consumer. Wine cipher becomes more complex and mysterious as the hype around the celebrity sommelier phenomenon continues to grow. It is now trendy to portray wine as an even more obscure, unattainable, and coveted luxury good, understood only by a select few with an insiders-guide to decoding the cipher.

Circumventing Wine Cipher with A.I. and the Cyber Sphere

In the last decade, dozens of companies have released desktop and smartphone "wine apps" that are programmed to provide educational information, wine ratings, tasting notes, wine & food pairing recommendations, cocktail recipes, consumer information, and online or brick & mortar shopping formats, discounts and rebates, and even educational videos. First on the scene was the adaptation of an online database called Vivino. Vivino was created for oenophiles to catalogue and curate their collections with an option for storing tasting notes in a communal database and an active online auction house for purchasing and trading wines. Over the years, Vivino added a smart phone app capable of using the camera as a label reader

with recognition software technology that can identify wine labels by their UPC codes and link them to stored tasting notes and to real-time retail availability. "With almost 7.5 million users and over 13 million wine ratings (in 2014), Vivino is clearly a popular tool" (Lyon: 2015)[vii].

Delectable followed up with a more streamlined wine app version launched specifically for the smart phone used primarily for cataloging and networking your preferences. Shortly after this, Wine Enthusiast magazine created its own app with a database of interactive digital vintage charts and nearly 13,000 archived tasting notes, articles, and wine rating culled from its magazine over the last two decades, all which can be shared on your social media platforms. (Lyon: 2015) Perhaps the wine app with the most potential for educating your palate and vocabulary is Wine Ring, which came onto the market in 2016. According to their official website, "Wine Ring is the leading A.I. driven B2B personalization software on the market and is differentiated because of our team of Master Sommeliers and Masters of Wine (www.winering.com)." Founded by two wine industry professionals, Pam Dillon and Andrew Sussman, Wine Ring employs 23 of the most influential wine personas in the world including Masters of Wine and Master Sommeliers, Ph.D.'s, mathematicians, statisticians, and other industry leaders. Wine Ring is "a whole new kind of recommender"[3] based off of individual preferences which consider age, gender, geographical location, and accessibility to diverse wine offerings. Adding this required data to your "love, like, so-so, dislike" assessments of various recommended wines, Wine Ring data mines for you and allegedly steers you toward tailor made selections for your palate, price-range, and preferences. These wine apps provide an 'educated' platform for selecting wine and sharing preferences through vast networks of peer consumers. In using these wine apps and others like them, consumers needn't bother learning wine cipher or the methods for decoding the language of wine. These apps allow consumers to present an appearance of sophistication, knowledge, and an insider take on the

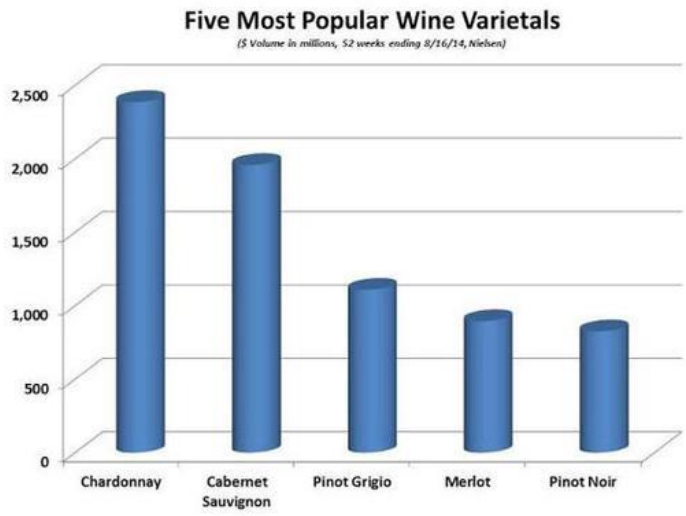
[3] "Wine Ring is the leading AI-driven, B2B personalization software for the wine industry, focused on individual consumer preference. Our software analyzes consumer sales and ratings, and then makes inventory-based recommendations for individual consumers and households. Our patented preference engine plugs right into your platform. All recommendations are based on individual preferences, not crowdsourcing or groupthink. Our preference engine was built by a team that includes PhDs in physiology and applied mathematics, and one of the largest groups of wine masters in the world. Our Masters of Wine and Master Sommeliers taste for hundreds of characteristics each vintage. We use those characteristics and your ratings to make recommendations for you. Masters of Wine and Master Sommeliers have earned the highest qualifications in the wine industry. Both credentials require years of study and a whole lot of blind tasting experience. Our Masters of Wine and Master Sommeliers taste thousands of wines a year. Turns out that people and machines work best together in identifying wine preferences." (www.winering.com)

wines that they are discussing, selecting, and sharing. It is an illusion for most and a tool for learning for some.

The problem with AI, Cyber Sphere, and Wine

There are more than 1400 indigenous grape varietals scattered across the globe but only twenty varietals make up eighty percent of all wines produced annually that are consumed by ninety-five percent of wine drinkers. The remaining twenty percent of these indigenous grape varietals become underappreciated, obscure wines that are produced and consumed locally. Vary rarely do these wines gain any recognition or industry support and they are most often novelty items on wine lists and wine store shelves. Occasionally, one of these strange varietals will strike the interest of the sommelier class and gain temporary celebrity status.

Robert Parker Jr. and other influential wine critics are the "modern day version of the Renaissance gentried aristocratic gate keeper whose main interest in wine was financial: used to increase holdings and influence through the promotion of their wines in a socio-economic scheme for market share domination. During the late Middle Ages and Renaissance, the Catholic monks legally controlled wine production and distribution with each monastery and order jockeying for position as the official wine purveyor to the Vatican, aristocracy, and royal family networks across Europe, Russia, Great Britain, and the Colonies. Three regions were privileged above all others: and their respective varietals continue to share the main stage spotlight: Bordeaux, Burgundy, and Champagne, all in France. The grapes that naturally grow best in these regions are Cabernet Sauvignon, Merlot, Pinot Noir, and Chardonnay, respectively. It's not for nothing that these are the most sold grapes of the last seven decades; it is 600 years of social and economic engineering. Cabernet Sauvignon, Merlot, Pinot Noir, and Chardonnay have been cultivated to be global money makers for centuries. In 2017, the global wine industry produced 275,7 million hectoliters and earned $340 billion dollars with the top five varietals (Cabernet Sauvignon, Merlot, Pinot Noir, Pinot Gris, and Chardonnay) accounting for more than eighty percent of global sales.



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French wines were and still are the pinnacle of sophistication followed by a select few regions in Northern Italy and Germany. Table wines from the Iberian Peninsula and the Austro-Hungarian regions have never been considered relevant on the global market until very recently. (Fortified wines excluded).These regions and their indigenous grapes have repeatedly been thwarted in their attempts at branding themselves as luxury wine goods. Already struggling for market share, wine app algorithms will potentially perpetuate this issue as categories of wines will quickly be eliminated. One's language, palate and cellar will actually be more limited as consuming choices are defined, redefined, and defined again based on swiping left or swiping right as the data capturing programs narrow the field of preference. With that, I will leave you with my favorite quote about wine:

"Wine is one of the most civilized things in the world and one of the most natural things of the world that has been brought to the greatest perfection, and it offers a greater range of enjoyment and appreciation than, possibly, any other purely sensory thing."
-Ernest Hemingway

Biography

Simone FM Spinner is an INTDCS doctoral fellow researching the aesthetics, neuroenology, and culture of wine and exploring the effects of climate change on wine related world heritage. Spinner is a passionate wine scholar who designed the first independent wine studies degree for Metropolitan State University of Denver, Colorado. She earned her self-guided Master of Humanities degree at the University of Colorado, Denver, where she wrote her thesis called "The Aesthetics & Culture of Wine." She is a Wine & Spirits Education Trust Diploma holder and a Court of Master Sommeliers Certified Sommelier. Spinner attained thirteen wine certifications during her lengthy career in the wine industry. She is a wine educator, academic, author, and activist. Spinner hopes to consult for UNESCO World Heritage Center upon completing her PhD.

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