

Instruments of Music Theory

Wednesday, November 8:

10:00am–12:10pm Instruments in Theory/Theories as Instruments

Stefano Mengozzi (University of Michigan), chair

Etha Williams (Harvard University), “*La femme clavecin?*: Marie-Angélique Diderot, the *Leçons de Clavecin*, and the Engendering of Music Theory”

Zhuqing (Lester) Hu (University of Chicago), “Loss in Conversion: Zithers, Organs, and Fourteen-Tone Temperament in the Global Music Exchange in Eighteenth-Century China”

Karl Braunschweig (Wayne State University), “From Language to Literature: Changing Roles of Reduction in Historical Music Theory”

Scott Gleason (New York University), “Historical Music Theories as Instruments in David Lewin’s Music Theories”

12:10pm–1:20pm *Lunch (on own)*

1:20pm–2:40pm David Catalunya (University of Würzburg), Keynote Lecture-Demonstration, “Instruments of Theory and Theory of Instruments in the Late Middle Ages”

2:40pm–3:00pm *Break*

3:00pm–4:30pm Theories of Instruments

Emily Dolan (Harvard University), Chair

Leon Chisholm (Deutsches Museum, Munich) “From Voice to Keyboard: A Tale of Two Ecologies”

Rebecca Cypess (Rutgers University), “*Basso continuo* at the Harpsichord in Early 17th-Century Italy: Recovering Traces of Embodied Knowledge”

Bryan Parkhurst (Oberlin College) and Stephan Hammel (University of California-Irvine), “On the Timeliness of a Marxist Organology”

4:30pm–5:00pm *Break*

5:00pm–6:30pm Alexander Rehding (Harvard University), Keynote Lecture, “Global Thoughts on Music-Theoretical Instruments”

6:30pm–8:30pm *Dinner Reception sponsored by the Journal of Music Theory and The Heyman Center for the Humanities at Columbia University*

8:30–10:00pm David Catalunya, Clavisimbalum Concert, “Faenza 117: Virtuoso Keyboard Music in Fourteenth-Century Italy”

Thursday, November 9:

9:00am–11:00am Instruments of Theory

Thomas Christensen (University of Chicago), chair

Elizabeth Lyon (Cornell University), “Instruments of the Affections in Jean Gerson’s *Tractatus de Cantibus*”

David E. Cohen (Columbia University), “The Tensed String, the Intent Ear: Combative Instrumentalities in a Founding Myth of Western Music Theory”

Joon Park (University of Arkansas), “Calligraphy as a Conceptualizing System of Traditional Chinese and Korean Musical Pitches”

Abigail Shupe (Colorado State University), “The (Scientific) Instruments of Rameau’s Music Theory”

11:00am–11:15 Break

11:15am–12:45pm Gabriela Currie (University of Minnesota), Keynote Lecture, Title TBA

Friday, November 10, 9:00pm–11:00pm:

AMS Evening Session: Instruments, Diagrams, and Notation in the History of Music Theory

Andrew Hicks (Cornell University), chair

Lars Christensen (University of Minnesota), “Musical Diagrams as Instruments of Strategic Simplification in the Northern Song Dynasty”

Stephanie Probst (Harvard University), “Following the Lines on Percy A. Scholes’s ‘AudioGraphic’ Piano Rolls”

Jennifer Iverson (University of Chicago), “At the Intersection of Acoustics, Phonetics, and Music: The Mixtur-Trautonium as Boundary Object”

Siavash Sabetrohani (University of Chicago), “The *Oud* as the transmitter of Ancient Greek Music Theory in the Middle East”

Alexander Bonus (Bard College), “Refashioning Rhythm: Hearing, Acting, and Reacting to Metronomic Sound in Nineteenth-Century Observatories, Laboratories, and Beyond”

Abstracts (alphabetical)

Alexander Bonus, Bard College

Refashioning Rhythm: Hearing, Acting, and Reacting to Metronomic Sound in Nineteenth-Century Observatories, Laboratories, and Beyond

In our musical era, metronome technologies are without a doubt normative tempo-tools, widely used by today's classically trained performers, scholars, and educators. Due to the ubiquity of these machines, their importance seems self-evident. For many, playing "in time" invariably means synchronizing to metronomic sound. Indeed, these machines are so deeply embedded into modern-age rhythmic theory that few metronome-users realize the extent to which automatic metronomes have helped to shape and reshape musical pedagogies, compositional aesthetics, and performance practices since the twentieth century. As my recent publications document, the late nineteenth century witnessed the start of a profound metronomic turn, whereby automatic sound-measurement became the conceptual underpinning of musical tempo, meter, and pulse. A testament to this strong technological impact, metronome-defined temporality is a mainstay in musical pedagogies and practices to this day.

As the current paper reveals, the metronomic turn has clear origins, not within romantic-age music theories or Enlightenment-era ideals, but in nineteenth-century astronomical observations. It was through astronomers' recordings of celestial phenomena that a new metronomic performance-tradition was established, one that opposed prevailing musical-temporal practices and epistemologies. In order to understand the import and ubiquity of metronome technologies in the present age, this scientific-cultural history further details the novel Industrial-Age methodologies of late nineteenth-century "rhythm" researchers, who used metronome apparatuses to ascertain and promote new, precision modes of activity. As I argue, these nineteenth-century scientists—being the first objectivist tempo-theorists—invented the modern metronomic-musical condition; their initial, mechanistic rhythmic theories, research methods, and experimental practices that have since come to motivate many current musical activities "in time."

Karl Braunschweig, Wayne State University

From Language to Literature: Changing Roles of Reduction in Historical Music Theory

Reductions are one of the most central experimental instruments in music theory: they are notational/graphic representations that can also be played, thus testing

their truths as representations of musical events, and consequently, the validity of a theory. But what questions theorists address using reduction changes fundamentally between early examples (dissonance treatment, fundamental bass) and later ones (formal plans, graphic technique). The latter represent the emergence of structure and design in musical thought, as opposed to the former in which reduction simply tested the identity of singular moments within a sequence of musical events, understood as a kind of musical grammar. Essentially, Schenker's complete-work reductions test the validity of a work as aesthetic object, they test a plausible hearing, and ask if it coheres. The emphasis is no longer on the grammar of the (musical) language but on the works uttered in that language: no longer one of *langue* but of *parole* (Saussure). Reductions are therefore crucial for providing a material form for elusive language conditions in music. Foucault suggests that the epistemological shift around 1800 includes the emergence of literature as object, not simply a collection of isolated works but a virtual structure instilled with new epistemic values. In the use of reduction as a music-theoretical instrument, we can thus trace a shift from a concern with grammatical identity and order to one of complete masterworks within a coherent, autonomous tradition. In Foucault's terms, the history of reduction marks a shift in the object of theory: from language to literature.

Leon Chisholm, Deutsches Museum, Munich

From Voice to Keyboard: A Tale of Two Ecologies

Writing in 1556, music theorist Hermann Finck chastised musicians who could not compose polyphonic vocal music without resorting to a keyboard instrument. Two centuries later, the keyboard was a standard prop in compositional training throughout Europe and, as extant *partimenti* attest, it remained so throughout the nineteenth century. Over roughly the same period, an analogous shift occurred in visual models of the gamut: the Guidonian hand and ladder—mnemonic devices used in the training of singers—are predominant in sixteenth-century music theory texts; in the eighteenth century, keyboards became a common alternative means of visualizing the gamut.

While scholars have acknowledged the shift from a voice-centered paradigm of musical thought to a keyboard-centered one (e.g., Lester, 1992; Powers, 1998), attention has focused on formal and, thus, disembodied implications. To fully understand the impact of this conceptual sea change, I argue, it is essential to consider the ecology of music-making that underpins it. I use *ecology* to refer to the interconnection between musicians, their instruments, and other aspects of their

environment. This paper outlines the difference between group singing (for which sixteenth-century counterpoint was designed) and keyboard playing as media for polyphonic music. Viewed from the perspective of labor distribution, the difference between the two modes of music-making can be construed as mechanization: group singing involves multiple skilled agents working in cooperation; keyboard playing requires only a single agent operating a machine that replaces the other agents. I argue that this ecological difference illuminates stylistic change and the emergence of tonality.

Lars Christensen, University of Minnesota

Musical Diagrams as Instruments of Strategic Simplification in the Northern Song Dynasty

Diagrams in music theory operate in an idealized domain; their logic is seductive only insofar as it is insulated from the ambiguities and complexities that inhere in actual musical and historical contexts. Consider the cosmological diagrams produced during the Northern Song dynasty (960-1127), which elucidate esoteric correspondences between various far-flung domains of experience, sometimes incorporating the discretely enumerated musical parameters of pitch and timbre. They show correlations as closed systematic structures, with internal coherence serving as an argument by parsimony that would require little further justification. In doing so, however, the devisors of the diagrams had to strategically elide complexities on all sides. They had to silently normalize the terms of correspondence; for instance, a calendar of twelve months can correspond to a gamut of twelve pitches only by obscuring both intercalary months and Pythagorean commas. Mismatches in the sizes of enumerated sets could force devisors to find additional terms to establish a complete correspondence and avoid unseemly gaps. Finally, the resultant structures resisted the encoding of the diachronic changes that yield music history. I argue that, in the intellectual environment of the Northern Song, these necessary simplifications were in fact features that contributed to the ideological justification of archaizing practices of ritual music and served as instruments to reduce the anxiety scholars felt towards both incommensurability and historical drift by insisting instead on the perpetuation of totalizing and unchanging structures.

David E. Cohen, Columbia University

The Tensed String, the Intent Ear: Combative Instrumentalities in a Founding Myth of Western Music Theory

If music theory has a foundation myth it is surely the legend of Pythagoras and the hammers. The earliest extant version of this story, contained in the *Inchiridion musicè*s of Nicomachus of Gerasa (ca. 100 AD) emphasizes, as much as the interval ratios themselves, the unusual instrumental means Pythagoras devises to acquire the privileged scientific knowledge those ratios represent; it celebrates an epistemological status achievable only by virtue of a special kind of instrument. That instrument is *not* the monochord, with its variable string *length*. Rather, it is a specially constructed apparatus that uses proportionally related weights (as in the blacksmiths' hammers) to vary—with notoriously erroneous results—not the lengths of its four strings, but their *tension*.

This unexpected and oddly inept substitution of tension for length represents (I suggest) an attempted refutation of Aristoxenus's dismissal of quantitative harmonics. Aristoxenus conceived harmonics' proper study as "the nature of the well-attuned": the immanent logic of functional musical relations intuited by the trained and intently listening internal musical "ear" (*akoè, phantasia*). But he also at one point famously defines the musical note in terms of "tension" (*tasis*), a concept he clarifies by invoking the (unquantified) tensing and loosening of a string.

By casting Pythagoras' mythical discovery in terms of *quantified* string tensions the legend appropriates this oft-cited and influential component of Aristoxenus's theory for quantitative harmonics, thereby implicitly asserting the latter's superiority. The myth thus dramatizes a fundamental and persistent tension within the field of music theory itself: the ideological friction between the mathematical and the functional, symbolically reducible to the contrast between two emblematic "instruments": the tensed string and the intent ear.

Rebecca Cypess, Rutgers University

Basso continuo at the Harpsichord in Early 17th-Century Italy: Recovering Traces of Embodied Knowledge

The emergence of *basso continuo* in Italy around the turn of the seventeenth century reflected profound changes in compositional thought that would persist in the Western tradition for two centuries or more. Yet *basso continuo* depended as much on the embodied knowledge of skilled instrumentalists as it did on compositional ingenuity. Agostino Agazzari emphasized that continuo players on various instruments needed to harness the intrinsic properties of each, using them idiomatically to respond to the expressive needs of the musical moment.

Approaches to *continuo* realization at each instrument must have been worked out by players through experimentation and discussion. While evidence of such unwritten practices is obviously lost, I argue that traces of this experimental process among harpsichordists survive in two unlikely sources: Luzzasco Luzzaschi's *Madrigali* (1601) and Girolamo Frescobaldi's *Toccate* (1615). Luzzaschi's madrigals are characterized by the soprano-bass polarity made possible by *basso-continuo* thinking, but its harpsichord accompaniment is written out in tablature, which guides the player's hands in voice-leading and texture. What Luzzaschi's text fails to convey are the subtleties of idiomatic arpeggiation and figuration. These factors, however, may be elucidated through the solo keyboard toccatas of Luzzaschi's student Frescobaldi, which Frescobaldi famously said should be executed "in the manner of modern madrigals." Like *basso continuo* accompaniments, Frescobaldi's toccatas are constructed through the elaboration of schematic chordal frameworks. His performance instructions, which treat idiomatic arpeggiation, ornamental figuration, and suspension of the tactus, bear suggestive implications for *continuo* playing at the harpsichord, describing an idiomatic approach to the expressive realization of harmony.

Scott Gleason, New York University

Historical Music Theories as Instruments in David Lewin's Music Theories

While music theory has historically employed physical and formalist instruments or tools to aid its exploration of musical structure and experience, in this talk I discuss how historical music theories can be leveraged as instruments for music-theoretical exploration. I focus on a model of historiographical instrumentality employed by David Lewin, which I explicate using Nietzsche's three historiographies: the antiquarian, critical, and monumental.

I read an origin myth in Lewin's account of Fétis's "intuition" at the emergence of tonalité: an origin myth for Lewin's own historiographical and theoretical practices. While Lewin felt emboldened to embrace Riemann's theories in his 1987 *Generalized Musical Intervals and Transformations* (GMIT), published in the same year as his brief article on Fétis, this embrace led to Lewin's overcoming of Riemann, to Lewin's use of Riemann's transformations for his own music-theoretical (self-)actualization. Lewin's appendices to GMIT serve as sweeping explorations of the music-theoretical past, and yet propose a future.

Although appreciative of historical music theories on their own terms, Lewin invariably put those theories to use. I argue Lewin's was a sporadic, non-narrative

though teleological use of the past in the present for the sake of the future Nietzsche theorized as the *monumental* mode of historical writing. Historical music theories became for Lewin instruments for his own theorizing, which he played alongside his exploratory work. Lewin felt himself the equal of these theories; his own theories he conceived in moral terms, as life-changing. Reading Lewin's treatment of historical music theories as instruments of his own theoretical practices enables us to understand how the history of music theory could become instrumentalized, leveraged for music-theoretical speculation and musico-moral betterment.

Zhuqing (Lester) Hu, University of Chicago

Loss in Conversion: Zithers, Organs, and Fourteen-Tone Temperament in the Global Music Exchange in Eighteenth-Century China

In *De la musique moderne des chinois* (1754), Jean-Joseph Marie Amiot remarked that, under the Qing empire (1636-1911), Chinese music “has not advanced from where it was for two or three thousand years.” Orientalism aside, Amiot's statement is genuinely perplexing. His main source, the Qing's official treatise *The True Doctrine of Music* (1713/1746), rejected Pythagorean tuning, which had guided Chinese music for millennia. Instead, it devised a fourteen-fold division of the octave and applied it to every instrument in the court ensemble.

How did Amiot miss this iconoclastic temperament even while replicating its numbers into his treatise? In pursuing this question, my paper illustrates an “instrumental turn” in music theory in early-modern China. In reconstructing the legendary ancient music, Qing scholars dismissed the tuning data in millennia-old classics as superficial to their essence. Turning to empirical experiments, or so they claimed, they further distinguished aerophones from chordophones: though applying to both on paper, mathematical proportions fail at tuning aerophones in practice, which relied on the ear to make end corrections. Not only did the rupture of instruments from mathematics engender the fourteen-tone temperament as a solution, but the skepticism of ancient texts also accommodated an unlikely source of inspiration: the organ at the Cathedral of Beijing, whose reputed designer, Portuguese Jesuit Tomás Pereira (1645-1708), also authored a Chinese-language treatise on organ tuning. The misencounter between Amiot and Qing's fourteen-tone temperament prompts us to reexamine the circulation of instruments, in addition to ideas, of music theory in the 18th-century global Enlightenment.

Jennifer Iverson, University of Chicago

At the Intersection of Acoustics, Phonetics, and Music: The Mixtur-Trautonium as Boundary Object

In 1952, the performer and inventor Oskar Sala (1910-2002) unveiled the Mixtur-Trautonium, his own extension of the electronic monochord-like instruments developed and marketed by Friedrich Trautwein (1888-1956) and Sala in the 1930s and 40s. In the bass range, Sala's Mixtur-Trautonium sounded pitches from a subharmonic series—a mirror inversion of the harmonic series—by incorporating a complex second circuit of oscillators and filters. Sala's fascination with the subharmonic series recalls the 19th century concept of “undertones,” and implicitly recalls Riemann's dualist generation of the major and minor triads—itself a theoretical extension of the acoustical arguments of the physicists Oettingen and Helmholtz. Yet there was also a more contemporary inspiration for Sala's mixtures, namely Stumpf's extensive elaborations of vowel formants in phonetics. The Mixtur-Trautonium was then a prototype to explore several scientific strands: the theoretical curiosities of undertones (acoustics and psychoacoustics), as well as the bodily curiosities of the vocal system where filters define formant bands (phonetics).

In music theory, Sala's subharmonic series resonates one degree further with Stockhausen's post-war multiplicative and divisive generations of time/pitch in “...how time passes...” Stockhausen's high-art WDR studio experiments with timbre, using generators, tape, and additive synthesis, seem at first glance oddly distant from Sala's reams of film music sound effects produced with the Mixtur-Trautonium. We should, however, reconsider the ways in which the project of electronic music in the 1950s enables a convergence of scientific and musical insights that are directed toward cultural rebuilding. The Mixtur-Trautonium functions as a boundary object, an instrument that provides an interface between multiple worlds. The sub-harmonic preoccupations of Sala's Mixtur-Trautonium make visible the intersections between (psycho)acoustics, phonetics, music-theoretical knowledge, and electronic technologies.

Elizabeth Lyon, Cornell University

Instruments of the Affections in Jean Gerson's Tractatus de Cantibus

Jean Gerson (1363-1429), doctor of theology, was Chancellor of the University of Paris from 1395 and a reformer with a central role at the Council of Constance and the reconciliation of the Great Schism. A prolific writer on many subjects, his output includes a unique set of mystical writings centered around music and song. His *Tractatus de Cantibus* guides the reader in the use of music as a means of spiritual

ascent from the sounding music of the senses, through the “intellectual music” (*musica intellectualis*) of reason, up to the “anagogic songs” (*canticae anagogicae*) of theology. To aid the reader, Gerson developed the idea of a mystical scale (*gamma mysticum*) modeled on the hexachord. Five basic notes (*voces*) – joy, hope, fear, pain, and compassion – modulate the reader’s affections towards God. Gerson further elucidates the *gamma mysticum* through a fascinating array of instruments: the monochord of Jesus Christ, a musical chessboard representing the spiritual war of the affections, and the *psalterio decacordo*.

Using the *Tractatus de Canticis* as a case study, I consider how allegorical uses of music theory may contribute to knowledge of and expertise in extra-musical domains and suggest ways in which these uses feed back into the aesthetics of sounding music. Taking into account Gerson’s understanding of psychology and the affections, I consider how his *gamma mysticum* is instrumental for spiritual ascent in both theory and practice by 1) determining why particular musical structures and their theoretical representations can contribute towards the achievement of desired affective states, and 2) showing how the spiritual practice of the *gamma mysticum* may have impacted the musical listening practices of Gerson’s readers.

Joon Park, University of Arkansas

Calligraphy as a Conceptualizing System of Traditional Chinese and Korean Musical Pitches

This talk draws a connection between traditional writing practices and musical conceptualization in East Asian music theoretical writings. “Transparent” (清) and “murky” (濁) are two characters, among many, that distinguish pitch difference in traditional Chinese and Korean writings. East Asian writing practices employ four essential tools (文房四寶): inkstick, inkstone, brush, and paper. Before writing any manuscript, one must prepare the ink by grinding the inkstick on an inkstone with a well of water. I argue that the repeated physical experience of producing ink made the change of transparency as a primordial phenomenon in East Asian cultures, which is, then, used as a conceptual basis for understanding musical pitch.

During the Song dynasty, transparent and murky seem to have coexisted with high (高) and low (下) when describing pitch difference. Song theorist Chen Yang (陳陽) writes that instead of high and low, which can extend to infinity, transparent and murky can aptly describe the fact that a pitch returns in higher or lower register (i.e., the Western octave equivalency). The fact that one can write the same

character with a differing density of ink seems to be the basis for Chen’s argument. Unlike the Western “high” and “low” whose conceptual basis could be drawn from sources such as numerical foundations (Duchez 1979; Nolan 2002; Creese 2010), Aristoxenian phenomenology (Barker 1989; Cohen 2001), and horizontal writing practice of the Carolingian era (Rocconi 2002), I hope to shed light on the East Asian conceptualization of pitches, which have not been discussed in terms of their conceptual basis.

Bryan Parkhurst, Oberlin College and Conservatory, and Stephan Hammel, University of California – Irvine

On the Timeliness of a Marxist Organology

Recently, scholars such as Rehding (2016) and Tresch and Dolan (2013) have brushed some of the cobwebs off of the rather moth-eaten musicological sub-discipline of organology. Their important efforts to situate the study of musical instruments within the broader anthropological and sociological study of human practices and institutions opens the door for a Marxist telling of the history of music. The version of this project we envision seeks to conceptualize musical “instruments”—broadly conceived as any enabling device or method that enters into the making of music—as part of music’s historically developing productive forces. Three main theoretical burdens are shouldered by a historical-materialist organology of this sort. The first is to disclose the dynamics that drive the development of music’s forces of production. What determines how music’s instrumental technologies develop and change, and how can Marx’s theory of capital accumulation be of use in answering this question? The second is to demonstrate the manner in which and the extent to which music’s forces of production are determinative of its character and qualities, of the meanings it bears, and of the uses to which it is put. How, and how much, are instrumental productive forces, so to speak, the grounds of the sounds? The third is to address the same Marxian question concerning music’s instrumental productive forces that must be asked about productive forces in general: what, if anything, do these forces have to do with transcending capitalism’s “law of value,” and what will they be like once it has been transcended? Our paper argues that these questions are important and overdue for consideration, and is a preliminary methodological sketch of how to go about answering them.

Stephanie Probst, Harvard University

Following the Lines on Percy A. Scholes’s “AudioGraphic” Piano Rolls

British music educator Percy A. Scholes's *AudioGraphic Music* (1925–30) promised to bring the “love of fine music” to everyone, including the musically untrained. The educational initiative featured selected recordings from across music history on the Aeolian Company's reproducing player piano rolls. Scholes doubled the use of these rolls by employing them as both sound recordings and visual artifacts. He added introductory texts, pictures, and analytical commentary onto the rolls, which would unfold as visual cues in time with the music and guide the listeners' experience of the piece.

Focusing on the “analytical series” of *AudioGraphic Music*, my paper explores the pedagogical potential of these rolls as instruments of music theory. I examine in particular the notational solutions that Scholes chose to convey music-analytical information, and argue for a twofold strategy: firstly, of employing a direct relation between aural and visual stimuli; and secondly, of tying across music's discrete and continuous forms of representation. Scholes captured most analytical insights through red lines drawn across the perforations on the rolls. I analyze how these lines parse the musical texture – highlighting themes, melodic contours, and formal structures – and what theoretical frameworks they imply.

Moreover, I read these hand-drawn lines as connecting the discrete marks of the sound recording technology. Here, I revisit Alexander Rehding's recent colloquy in *JAMS* (2017) and the media-theoretical disruption diagnosed by Friedrich Kittler between the continuous strokes of handwriting and the discrete symbols of the typewriter. I propose that Scholes's music-theoretical annotations mediated an analogous divide in music.

Siavash Sabetrohani, University of Chicago

The Oud as the transmitter of Ancient Greek Music Theory in the Middle East

With the onset of Islam in the Middle East, and after the establishment of a Muslim dominance over the entire region, a new musical language seemed necessary. With the founding of the “House of Wisdom” in Baghdad in 832, an unprecedented number of Greek writings on diverse fields were translated into Arabic. Among them were musical treatises by Aristoxenus, Ptolemy, Nicomachus, Euclid, and others.

While many aspects of Greek music theory were incorporated into the new musical system of the Islamic Caliphate, some of them took an entirely different shape. One of the fundamental differences concerned the pitches of the tonal system: In opposition to the traditional eighteen-fold tonal (Greater Perfect) system of the

Greeks and its Islamic adherents (such as Al-Kindi), the followers of Ishaq al-Mawsili believed in a ten-fold division of the tonal system.

Another difference was the replacement of the monochord—the main instrument of music theory for the Greeks—with the *Oud*. In my paper, I will look at a few representative treatises from this period, focusing particularly on how the *Oud* was used to teach and exemplify aspects of Ancient Greek canonic—as well as its Islamic variants. From the earliest extant Middle Eastern treatises dating from the ninth century, to treatises engaging with Greek music theory written as late as the fifteenth century, we will see how the *Oud* was used as a didactic instrument in order to illustrate and instantiate theoretical models of the newly developed tonal system of the Islamic world.

Abigail Shupe, Colorado State University

The (Scientific) Instruments of Rameau's Music Theory

Rameau's experiments in *Génération harmonique* (1737) have long been assumed to share some features with Newton's *Opticks* (1704). Some scholars even claim that Rameau specifically modeled his work after *Opticks*. However, in my close reading of these two documents, I argue that the material instruments of both authors reveal significant epistemological and methodological differences. These instruments include some specialized scientific and musical equipment, along with household items that many readers would have at home. Newton's experiments possess a domesticity that appealed to a general readership in new ways that Rameau perhaps sought to imitate.

I demonstrate that, on one hand, the instruments and materials in Rameau's experiments connect him with a broader cultural enthusiasm for Newton's experimental philosophy. Like other authors of the time, Rameau may have incorporated experiments into *Génération harmonique* in order to lend it an air of scientific legitimacy. On the other hand, Rameau deploys these instruments in ways that show his allegiance to older perspectives and that illustrate his at-times conservative intellectual position. Though the experiments in his first chapter seem to indicate a new empirical justification for his work, my study of his materials and results shows that his work is not empirical. By situating Rameau's work within the rise of scientific instrumentation in the early eighteenth century, I show the paradoxically innovative and yet traditional nature of the instruments of Rameau's music theory.

Etha Williams, Harvard University

La femme clavecin?: *Marie-Angélique Diderot, the Leçons de Clavecin, and the Engendering of Music Theory*

Denis Diderot and Anton Bemetzrieder's *Leçons de clavecin* (1771) has long attracted attention from historians of music theory and literary scholars alike. However, existing work on this treatise has paid scant attention to the intertwining roles of gender and instrumentality in Diderot and Bemetzrieder's treatise—even as the text's idiosyncratic harmonic theory borrows directly from feminized constructions of sensibility. This inattention is all the more surprising in light of the fact that the dialogue's protagonist is explicitly identified as Diderot's daughter, Marie-Angélique de Vandeuil, whom Charles Burney praised as "one of the finest harpsichord-players in Paris" and as possessing "a knowledge in Modulation to which so few of her sex have *ever* arrived."

Drawing on close reading of the *Leçons* and archival work at the Diderot family archives, my paper advances two lines of argument: first, that the touch of the *élève's* hands on the harpsichord's keys productively mediates between the feminized sensible body and masculinized understandings of harmonic science; and second, that the text's dialogic form playfully stages Marie-Angélique's keyboard playing as a challenge to gendered expectations concerning musical, and music-theoretical, decorum. I ultimately argue that, through the interaction of their sensible bodies with their keyboard instruments, both the character of the *élève* and the person of Marie-Angélique creatively reconstructed harmonic science on a more ambiguously gendered ground, invoking the keyboard's powerful status icon of female social accomplishment to trouble its equally powerful status as an emblem of music-theoretical mastery.