

Conference Frontiers of Quantum and Mesoscopic Thermodynamics 2024

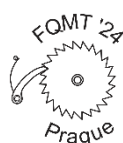
Public Lectures of Theo Geisel and Allen Hermann with Jazz Concert

Main Hall of the Pyramida Hotel
Tuesday July 23, 2024

17:45 – 18:00	Opening
18:00 – 18:50	Theo Geisel: “Musical Synchronization and the Secrets of Swing”
18:50 – 19:00	Discussion
19:00 – 19:15	Break
19:15 – 20:05	Allen Hermann: “Fundamental Aspects of the Physics of Music”
20:05 – 20:15	Discussion
20:15 – 20:30	Break
20:30 – 22:00	Jazz Concert

Jazz Concert - Al Hermann and his guests

Trombone:	Al Hermann
Trumpet:	Miroslav Kejmar
Double bass:	František Uhlíř
Piano:	Stanislav Mácha
Drums:	Otto Hejnic
Special guest:	Theo Geisel (saxophone)
Special guest:	Tomáš Víšek (piano)



<https://fqmt.fzu.cz/24/>

Musical Synchronization and the Secrets of Swing

Theo Geisel

Max Planck Institute for Dynamics and Self-Organization, Göttingen, Germany

It is a widespread opinion that musicians who are interacting together in a performance should perfectly synchronize their timing. This view was challenged for the swing feel, a salient feature of jazz, which has eluded scientific clarification for a century. For much of this period it was considered arcane, arguing that swing can be felt but not explained, until a theory of 'participatory discrepancies' raised the controversial claim that swing is caused by microtiming deviations between different participating musicians and thus put a question mark on the synchronization of jazz musicians.

Using audio demonstrations, this public talk starts by introducing basic concepts like downbeats, offbeats and the swing ratio. It then describes how we clarified the controversy on the central role of microtiming deviations for the swing feel using data analytics and an experimental approach. The timing of different instruments was manipulated artificially and the resulting swing feel was measured through ratings of professional jazz musicians. This showed that involuntary random microtiming deviations are irrelevant for swing, but a particular systematic microtiming deviation between musicians enhances the swing feel and is a key component of swing in jazz. It consists in slightly delaying downbeats of soloists with respect to a rhythm section while keeping their offbeats in synchrony.

This effect was unknown to professional jazz musicians, who were able to perceive the differences, but unable to determine their nature. The effect apparently is used intuitively and unconsciously by jazz musicians.

Theo Geisel

Theo Geisel is director emeritus at the Max Planck Institute for Dynamics and Self-Organization and professor of theoretical physics at the University of Göttingen. He was chairperson of the Bernstein Center for Computational Neuroscience (BCCN) Göttingen, which he founded in 2005. His research is primarily concerned with the behavior of complex systems ranging from theoretical investigations in quantum chaos to nonlinear dynamical phenomena in the brain.

Theo Geisel is known for fundamental research on nonlinear dynamics with applications in a broad range of living and non-living systems. He is leading in transferring methods between fields, including chaotic motions of electrons in nanostructures, pattern formation and dynamics in neural networks, uncovering travel statistics for epidemic modeling by dollar bill tracking, and modeling the propagation of tsunami waves with analogies from nanoscience

He is also a classical and jazz musician and performs on flute and saxophone. As a student he recorded a jazz album with the band August Stockinger's Flohzirkus.

He was awarded the prestigious Gottfried Wilhelm Leibniz Prize (DFG, 1994), Fellow of the American Physical Society (APS, 2008), Gentner-Kastler Prize (Société Française de Physique and Deutsche Physikalische Gesellschaft, 2009).

Fundamental Aspects of the Physics of Music

Allen M. Hermann

University of Colorado, Boulder, Colorado, USA

In this lecture, we delve into the production of musical sounds and their organization into Western musical scales, beginning with an examination of the piano keyboard to establish musical nomenclature. For string instruments, wave motion and standing waves are fundamental, as these principles are universal to all instruments. We then explore the historical development of musical scales, starting with Pythagoras in the sixth century B.C.E., who devised a scale based on eight notes between the tonic and the octave, where the octave's frequency is twice that of the tonic. The other notes in this scale are determined by the consonance between the tonic and the fifth. We introduce the just scale, founded on the consonance between the tonic, the third, and the fifth, followed by the tempered scale with equal intervals.

While the physics of string instruments is often intuitive, understanding wind instruments can be more complex. We explain the basic principles of simple tubes, like flutes and clarinets, which can be open at both ends or closed at one end. Brass instruments, such as trumpets and trombones, involve more advanced concepts and typically play higher harmonics, unlike strings and woodwinds that predominantly play the fundamental harmonic. Throughout the lecture, we use real-world and plastic “toy” instruments to demonstrate these concepts, concluding with a jazz performance to illustrate their application.

Allen M. Hermann

Allen M. Hermann is Professor Emeritus of Department of Physics, University of Colorado, and a Fellow of the American Physical Society. He has contributed to basic research on transport properties of solids, and applied research. His research in this field culminated in the invention and development of a solid-state battery (lithium iodine) widely used in cardiac pacemakers. For his co-discovery of thallium-based high temperature superconducting materials he was elected, by superconductivity community, as person of the 1989 year. Allen is the author of more than 270 refereed journal articles and 31 US patents.

Allen Hermann (called Al in music circles) was also a professor of jazz trombone at University of Colorado. Al has played with the Woody Herman Orchestra, Lionel Hampton, Buddy Morrow, Wild Bill Davidson, Doc Cheatham, Ellis Marsalis, Warren Vache, Dave Grusin, Eddie Daniels, Arturo Sandoval, President Bill Clinton, and has sided with many famous vocalists including Ella Fitzgerald and Tony Bennett. He is featured on 20 CD's. His CD “The Jazz Trombone”, featuring Al and the renowned trombonist Carl Fontana, received critical acclaim worldwide. Al has been praised by many famous jazz authorities and musicians including Ellis Marsalis who calls him “A Master Jazz Trombonist”, Joe Alessi, Principal Trombonist, New York Philharmonic who says of him “Dazzled when I heard him. I highly recommend him to you.” The great trombonist Bill Watrous said of Al, “one of the best jazz trombonists on the planet,” and President Bill Clinton called him “One of America’s foremost physicists, and an even better trombonist”.

Performers

Al (Allen) Hermann

Al was born and raised in New Orleans where he backed such luminaries as Ella Fitzgerald, Tony Bennett, Julie London, and Peggy Lee. He has sided with the Woody Herman Orchestra, Lionel Hampton, Wild Bill Davidson, Doc Cheatham, Ellis Marsalis, Warren Vache, Dave Grusin, Eddie Daniels, Dave Pietro, Arturo Sandoval, and many others.

Al has recorded more than a dozen feature CD's, including "The Jazz Trombone" with Carl Fontana on the Sea Breeze (Los Angeles) label.

Al was Professor Adjunct of Jazz Trombone at the University of Colorado in Boulder, CO, and is currently Professor of Physics Emeritus at the University of Colorado-Boulder.

He has received many accolades:

"Nobody gets around the horn better than Al Hermann", **Carl Fontana**.

"The trombonist I most enjoy since Rosolino. He plays the wheels off the trombone", **Fred Wesley**.

"Dazzled when I heard him", **Joe Alessi**, Principal Trombonist, New York Philharmonic.

"One of the best trombonists on the planet", **Bill Watrous**.

"A Master Jazz Trombonist", **Ellis Marsalis**.

"A Premier Jazz Trombonist who plays with absolute authority", **Dr. Herb Wong**, past president of IAJE.

"Virtuoso Trombonist", **Jazz Workshop Australia**.

"One of America's foremost physicists, and an even better trombonist", **President Bill Clinton**.

Al plays his signature trombone mouthpiece (Willie's, Yamanashi, Japan) exclusively.

Miroslav Kejmar

Miroslav Kejmar graduated from The Prague Conservatory after studies with Professor Junek. He then studied in the class of Professor Václav Pařík at The Prague Academy of Arts. Already during his studies at The Academy of Arts in Prague, he played in various orchestras, e.g. in the Film Symphony Orchestra and the Czech Philharmonic Orchestra. Apart from guest appearing with several chamber brass ensembles, he works on a permanent basis with the Prague Brass Soloists, of which is a founding member. His career as a soloist is equally wide-ranging. He is well known to audiences in many European countries, as well as Japan. Apart from classical music, he is also interested in dance, jazz and popular music. For about three years he played in the orchestra involved in the famous musical, Jesus Christ Superstar. He was a member of the Karel Vlach orchestra. Miroslav Kejmar was, over thirty years, the first trumpeter of the Czech Philharmonic Orchestra, and played many years with the "Ten of the Best" ensemble, the famous international group of trumpeters. He nowadays plays frequently as a soloist; he is a member of the Prague Brass Soloists and Czech Philharmonic Brass ensembles.

Stanislav Mácha

Stanislav is a renowned pianist who has collaborated with star personalities of the domestic and international jazz scene (Dan Bárta, Robert Balzar, Piotr Baron, John Abercrombie, Craig Handy, Nicolas Simion and many others). He is currently actively performing and lecturing.

Otto Hejnic

Otto is one of the most sought-after Czech drummers and a member of many successful musical projects with Czech and international participation. He has released three albums as a leader and has been featured as a sideman on nearly 40 other albums. During his stays in USA, he has played with excellent musicians such as Joe Rybczyk Jr., Jason Fraticelli, Fitzgerald Jenkins, Gustavo Carucci, Marcin Garbulinsky, Ben Meigners, etc.

František Uhlíř

Who would not know the great Czech bassists Jiří "George" Mráz and Miroslav Vitouš, who achieved recognition and international fame not only in the USA? František Uhlíř, belonging to the same generation, is certainly the most prominent jazz musician on the Czech jazz scene today.

Tomáš Víšek (piano)

Tomáš Víšek developed his carrier as a solo pianist after graduating from the Prague Conservatory (Professors V. Kameníková and Z. Kožina), and from the Academy of Music Arts in the class of Professors J. Páleníček and Z. Jílek. He has established his reputation performing both famous and lesser-known repertoire, some of which being undeservedly neglected. He has toured throughout the world including Austria, Holland, Switzerland, France, Italy, Egypt, Japan, USA, and has made recordings for radio and television and on CDs. Tomáš Víšek won numerous prizes in international competitions (Hradec Králové, Vienna, Ragusa, Paris), in 2013 he won the 1st prize and CMF Prix at the "Concours Musical de France" in Paris, in 2015 the 1st prize at the competitions „Music Without Limits“ (Druskininkai) and „Grand Prize Virtuoso“ (video-competition), in 2016 and 2023 he won the 1st prize at the „International Master Competition for Music Teachers“ in Warsaw, in 2021 the 1st Prize at the "Golden Classical Music Awards" (with the performance at the Carnegie Hall), in 2022 1st Prize at the "Grand Prize Virtuoso" (with the performance at the Concertgebouw) and in 2024 the Silver Medal at the "Global Music Awards". His solo recital in the Prague Spring Festival in 1997 and the further performances there in 2002, 2003, 2006, and 2014 were met with high acclaim, as were his interpretation of Gershwin's Rhapsody in Blue in the sold out Rudolfinum concert hall in Prague.

