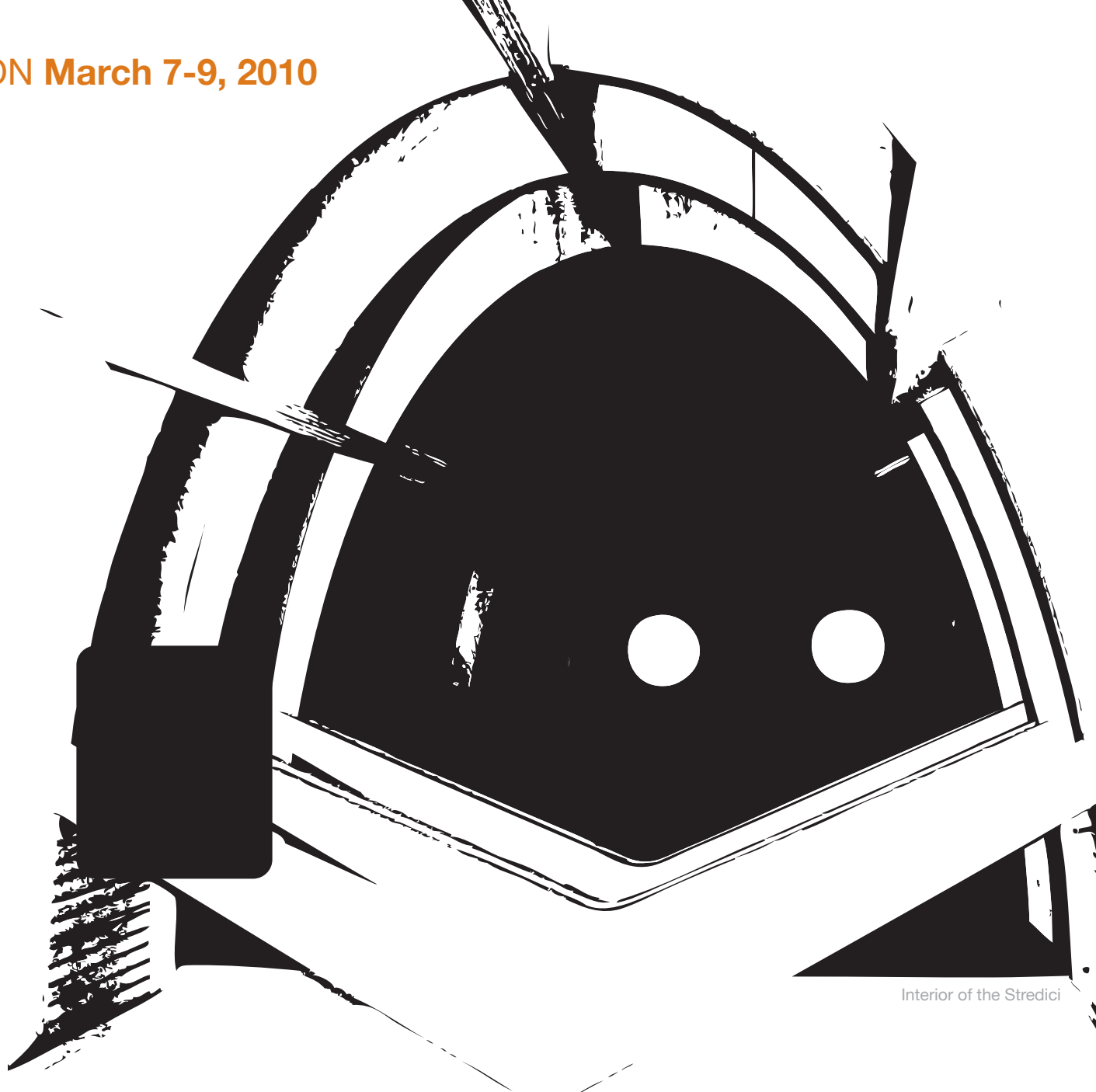


BOSTON March 7-9, 2010



Interior of the Stredici

# Bohlen- Pierce

## Symposium & Concerts

# Schedule

All presentations and concerts are FREE

## Sunday, March 7, 2010

Fenway Center, Northeastern University

2:00 PM	Registration
2:30 PM	Welcome speeches by Boston Micro-tonal Society, Georg Hajdu, Anthony De Ritis, Richard Boulanger, Detlef Gericke-Schönhausen (Director of Goethe Institute Boston)
3:00 PM	Heinz Bohlen: An early document on a novel scale
3:30 PM	Max Mathews: The Early History from 1982 to 1988 of John Pierce's Evolution of his Version of the Bohlen-Pierce Scale.
4:00 PM	Clarence Barlow: On the Harmonic Rationalization of Pitch Intervals of Known Size
4:45 PM	Curtis Roads: On Purity
5:15 PM	Coffee Break
5:30 PM	David Wessel: Designing and Performing Spectra Compatible with the Bohlen-Pierce Scale
6:00 PM	Psyche Loui: From Sounds to Music: Learning the Bohlen-Pierce Scale
6:45 PM	Dinner
8:00 PM	Concert, NU Fenway Center

## Monday, March 8, 2010

Williams Hall, New England Conservatory

1:00 PM	Richard Boulanger: Strategies and Solutions: Singing, Playing and Discussing Excerpts from my Bohlen-Pierce Compositions
1:45 PM	Georg Hajdu: Starting Over: Chances Afforded by a New Scale
2:30 PM	Paul Erlich: Commas, Temperaments, and Scales, with particular attention to the 'BP diatonic'
3:15 PM	Coffee Break & Discussion
3:45 PM	Ron Sword: Lecture, Demonstration of Bohlen-Pierce Scale Book, B-P Tuning systems, Presentation of 9-string B-P electric guitar and performance
4:30 PM	Todd Harrop: Dissonance and the Bohlen-Pierce Clarinet
5:15 PM	Larry Polansky: A Mathematical Model for Optimal Tuning Systems
6:00 PM	Discussion
6:45 PM	Dinner
8:00 PM	Concert, Berklee Fenway Building, rm F12

## Tuesday, March 9, 2010

Goethe Institute Boston

1:00 PM	Manfred Stahnke: The Bohlen-Pierce Scale in the Context of Just Intonation
1:45 PM	Stephen Fox: The design and construction of Bohlen-Pierce clarinets and other wind instruments
2:30 PM	Elaine Walker: Continuing Research on Perception and Performance of Bohlen-Pierce Scale
3:15 PM	David Lieberman: the SPACE between NOTES
4:00 PM	Coffee Break
4:30 PM	Gayle Young: cross-current
5:00 PM	Johannes Kretz: HOQUETUS II for two Bohlen Pierce clarinets and electronics
5:30 PM	Arturo Grolimund: A New Instrument – A New Scale
6:00 PM	Kevin Foster: Algebraic Aspects of the Bohlen-Pierce Scale
6:30 PM	Discussion
7:00 PM	Dinner
8:00 PM	Concert, Goethe Institute Boston

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Acknowledgements

The Bohlen-Pierce Symposium and Concerts is produced by the Boston Microtonal Society with Georg Hajdu (Hamburg Hochschule für Musik und Theater), in partnership with Goethe Institute Boston, Berklee College of Music, Northeastern University, and the New England Conservatory.

Questions?

Contact: info@bostonmicrotonalsociety.org

bohlen-pierce-conference.org

Welcome from the Boston Microtonal Society

We are happy and excited to welcome so many accomplished and eminent musicians and researchers, and to have the chance to share music and ideas. The Boston Microtonal Society features many approaches to microtonality in our concerts, as well as in our lectures and workshops—yet the Bohlen-Pierce scale was unknown in our circle until recently. Since promoting the practice and performance of microtonal music has always been our central mission, we were impressed by the extent to which this one scale, born of pure theory, has ultimately caught the imagination of so many composers, instrument builders, and performers. We were eager to collaborate with Georg Hajdu in this project, which brings together many interesting and creative minds. We look forward with great excitement to this celebration of the success of a musical idea.

Julia Werntz, Artistic Director  
James Bergin, Executive Director  
Boston Microtonal Society

Welcome from Georg Hajdu, Producer

It was during after a concert in May of 2008, when Julia Werntz, co-director of the Boston Microtonal Society and theory faculty at the New England Conservatory, and I first talked about the possibility centering a larger event around the Bohlen-Pierce scale. The first acoustic clarinets using the Bohlen-Pierce scale had just been developed by Toronto-based instrument maker Stephen Fox and used in a concert in Canada, as well as at a concert shortly thereafter in Hamburg, Germany.

Little did I know about the excitement that this idea would generate, particularly in the city of Boston, which seems to me the ideal place to advance a concept rooted in both academic research and artistic experimentalism—a place so unique for its abundance of venerable music institutions that it came as no surprise that a practitioner of Bohlen-Pierce music could be found here. This person, Richard Boulanger of the Berklee College of Music, came on board in September of 2009, after I had just learned that the Goethe Institute had accepted

my project proposal as part of their newly created artist residency program. Hearing about my stay, my friend and UC Berkeley classmate, Anthony De Ritis, now chairman of the music department at Northeastern University, invited me to teach a semester in his department, and provided the institutional backing that an endeavor such as this one dearly needs. Serendipitously, it turned out that my contact at the local Goethe Institute, Annette Klein, is a trained violist; we have immediately put her to work in the one piece that requires a viola.

I was excited by the response that our call for presentations elicited. The very best representatives in the field, foremost Heinz Bohlen and Max Mathews, collaborator and friend of the late John R. Pierce, have contributed to the first symposium exclusively dedicated to this scale, which was only discovered almost 40 years ago, when Bohlen lived in the city of Hamburg.

Here in Boston, the three concerts, with the extraordinary number of 24 premieres, are centered around musicians from three countries – Canada, Germany and the United States – representing current directions of acoustic, live electronic and computer performance of Bohlen-Pierce music, and encompassing a huge stylistic range from purely avant-garde to pop.

The Bohlen-Pierce scale, with its subdivision of the compound fifth into 13 steps, may never supersede our familiar 12-tone tuning, but it will provide an opportunity for diversity and the formation of a group of performers, composers, and theoreticians dedicated to a common goal: stretching our ears and inviting listeners to gently leave their comfort zone in order to explore unfamiliar, yet intriguing sonorities.

My gratitude goes to Julia Werntz and James Bergin of the Boston Microtonal Society, Anthony De Ritis of Northeastern University, Richard Boulanger of the Berklee College of Music, and Annette Klein of the Goethe Institute Boston for their relentless help and, in the latter case, for supporting a commission for four Bohlen-Pierce clarinets by my former teacher Clarence Barlow (who taught me think about scales and tonality in novel ways).

Compliments also to the numerous composers and performers who will take and already have taken their time and effort to contribute to the success of this event, and many thanks to the aforementioned institutions as well as the New England Conservatory for providing their spaces and refreshments for lectures and concerts. Kudos to Maureen Ton for her beautiful design work.

Georg Hajdu  
Professor of Multimedia Composition  
Hochschule für Musik und Theater, Hamburg

Welcome from Richard Boulanger

The Symposium will feature composers, inventors and performers who work with the Bohlen-Pierce microtonal scale, and will include concerts and lecture/demonstrations.

On behalf of the Berklee College of Music, I want to welcome all of you to the Bohlen-Pierce Symposium and to tell you all how excited I am to hear your work, to share my work, to present your work at Berklee, and to present the work of my Berklee students and alumni to all of you.

In the spirit of John Pierce, the grandfather of computer music and the co-discoverer of the Bohlen-Pierce scale, this important and historic gathering has brought together, for the first time, the artist and technological innovators from Northeastern University, The New England Conservatory and The Berklee College of Music. Spearheaded by Julia Werntz, James Bergin and The Boston Microtonal Society, and with the generous support of Annette Klein and The Goethe-Institute Boston, a group of incredibly passionate and gifted people, from right in the neighborhood, are now working together, sharing their unique perspectives, inspiring their students and colleagues, and most importantly, inspiring each other to write and perform incredible and important new music.

None of this would have happened without the vision and dedication of Professor Georg Hajdu from the Hochschule für Musik und Theatre in Hamburg. Georg, a visiting composer and professor at North-

eastern University, brought together not only the leading innovators here in Boston, but he reached out around the world to all of you, who for years now, have been researching, composing, performing, and building instruments in the Bohlen-Pierce scale. Thanks to Georg Hajdu for dreaming this dream and for making all of us a part of it. And thanks to all of you for answering his call and for coming here to Boston to participate in this this historically important meeting of minds and ears. We have all recognized that there is something very “special” about this Bohlen-Pierce tuning, and the proof is in the beautiful, powerful, and incredibly different music that we will all be presenting here during the symposium.

I extend the warmest welcome to all of you, and I thank you all for coming to Boston and for bringing and sharing your Bohlen-Pierce work, and inspiring all of us with your ideas, approaches, and solutions. It is my hope that what we discover together at this symposium will inspire us, and those who follow us, for years to come.

Dr. Richard Boulanger

Professor of Electronic Production and Design  
Berklee College of Music

Welcome from Anthony De Ritis

On behalf of the Music Department at Northeastern University, it is my pleasure to welcome you to the Bohlen-Pierce conference and concerts, and share with you the creative vision of Georg Hajdu and Julia Werntz, and a high-powered list of presenters and performers.

How cool is Boston?! Few cities in the world have three institutions such as the Berklee College of Music, the New England Conservatory and Northeastern University, all within a square mile of one another, and all with the desire to collaborate on such a unique and interdisciplinary topic as the Bohlen-Pierce scale. Add to that the support of such a prestigious cultural partner as The Goethe-Institute -- we have it good!

I’m super excited to have Georg Hajdu in residence as Visiting Professor of Music Technology. When I took my first computer music course at U.C. Berkeley, “MUS 158: Musical Applications of Computers and Related Technologies”, David Wessel was the genius professor, and Georg Hajdu, the genius teaching assistant. That experience altered the course of my life.

Julia, Georg -- thank you so much for inviting Northeastern to be a part of this conference. May everyone have a spectacular time! Let the brain stimulation begin!

Anthony Paul De Ritis, MM, MBA, PhD  
Professor and Chair, Music Department  
Northeastern University

# Bohlen-Pierce Scale

The Bohlen–Pierce scale is a musical scale that offers an alternative to the octave-repeating scales typical in Western and other musics, specifically the diatonic scale. It was independently described by Heinz Bohlen, Kees van Prooijen and John R. Pierce in the 1970s and 80s.

Pierce, who, with Max Mathews and others, published his discovery in 1984, renamed the Pierce 3579b scale and its chromatic variant the Bohlen–Pierce scale after learning of Bohlen’s earlier publication. Bohlen had proposed the same scale based on consideration of the influence of combination tones on the Gestaltimpression of intervals and chords.

With a step size of approximately a three-quarter tone (146 cent), the middle-Eastern second degree, the scale has both the quality of a symmetrical scale of 13 steps per just twelfth (tritave), as well as a tuning which serves as a collection for subsets of pitches for the modes Bohlen identified in the 1970s, which, for the most part, contain 9 unequal steps per twelfth.

Bohlen added the labels H and J to the repertoire of the note names used for diatonic scales. As the scale replicates at the interval of a just twelfth (3:1 ratio), it also lends itself to electronically stretched spectra based on a stretching index of 3. Approximating the partials to the pitches of Bohlen-Pierce scale reduces sensory dissonance and creates a coherence between the tonal and spectral dimensions of the tuning.

While early compositions in the Bohlen-Pierce scale mainly resorted to electronic sound generation, there is an increasing body of acoustic instruments capable of representing the scale such as the Bohlen-Pierce soprano clarinet, the BP pan flute, the BP guitar, a BP metallophone and a number of unusual instruments such as the Stredici. The ever growing interest in the scale by composers and theoreticians has created many resources of which the most important ones should be listed here:

- \* Bohlen–Pierce: Site for an alternative harmonic scale
- \* Bohlen–Pierce Scale Research by Elaine Walker
- \* Bohlen–Pierce clarinets by Stephen Fox
- \* Bohlen-Pierce Scale on Wikipedia
- \* TranSpectra
- \* Das Bohlen-Pierce-Klarinetten-Projekt at the Hamburg Hochschule für Musik und Theater
- \* Xenharmonic Wiki

Partially based on Wikipedia



# Abstracts

March 7, 2010  
Fenway Center  
Northeastern University

**Heinz Bohlen: An early document on a novel scale**  
The translation into English of a hitherto unpublished document from the early days of the Bohlen-Pierce scale gives some insight into the philosophy behind the scale and the motives of its co-discoverer.

**Max Mathews: The Early History from 1982 to 1988 of John Pierce’s evolution of his version of the Bohlen-Pierce scale**  
Most of what I plan to cover comes from two publications–”Theoretical and experimental explorations of the Bohlen-Pierce scale” J. Acoust. Soc. Am 84(4) October 1988 and ”Intonation sensitivity for traditional and non traditional chords” J. Acoust. Soc. Am 75(3), March 1984.

**Clarence Barlow: On the Harmonic Rationalization of Pitch Intervals of Known Size**  
For over two thousand years it has been known that two frequencies in a mutually small-number ratio form a harmonic interval. An example of this is the ratio 1:2, where one frequency is double the other, forming the interval of an octave. It is also undeniable that an interval with a large-number ratio close in intervallic size to a much more harmonic interval could be perceived as the latter. For example an interval with the frequency ratio 1000:1999 is only 0.07% or 1 cent smaller than an octave and would be taken for one. In such a case, the auditory perception mechanism “bends” the less harmonic interval to seem like its more harmonic neighbor.

Can one measure the harmonicity of an interval, given its ratio? Some work has been done here by various researchers. This paper will describe my own work in the field, in which – by means of an algebraic formula for harmonicity, which I developed in 1978 – satisfactory ratio lists for pitch sets (e.g. for diatonic, n-tone equal tempered or the Bohlen-Pierce scales) are extractable, given only the pitches’ distance in intervallic units (cents) from a given starting point. Furthermore, the rationalizations derived provide a description of the harmonic properties and potential of the pitch sets not evident in the mutual distances of their elements.

**Curtis Roads: On Purity**  
This talk presents an overview of the composition Purity (1994), one of three movements in the composition Clang-tint, commissioned by the Japanese Ministry of Culture and the Kunitachi College of Music, Tokyo. The pitch struc-

ture of Purity is based on the Bohlen-Pierce (BP) scale. I chose the full chromatic BP scale because of its intriguing sound. With its combination of intervals that were both sweeter and more sour than 12-note equal temperament, I saw strong potential for expressive melodic and harmonic structures. The ear is the most sophisticated sound analyzer we know, and it was by ear that I mastered the BP scale, a process that took many months. In Purity, the BP scale is embedded in a context of broader pitch strategy involving freely flowing glissandi and echo effects.

**David Wessel: Designing and Performing Spectra Compatible with the Bohlen-Pierce Scale**  
Two real-time additive approaches to the synthesis of materials in the Bohlen-Pierce scale are presented. The first uses hundreds of sinusoidal components and the second exploits a large bank of high-Q resonate filters. In each case spectral profiles are defined on a 9600 cent grid.The sinusoidal component synthesis control method involves migrating individual components from one spectral profile to another providing for slowly evolving and perceptually seamless spectral evolution. For timbres with percussive or plucked-like attack transients the resonate filter bank is used. The performance control interface consists of an array of two dimensional pressure sensitive pads interfaced by Ethernet to a computer running Max/MSP. Each pad has a number of spectral profiles mapped to it in such a way that movements of the fingers control transitions. Pressure is used to control dynamics. The layout of the profiles on the performance interface was designed in an iterative manner to facilitate discovery through exploration and improvisatory performance.

**Loui: From Sounds to Music: Learning the Bohlen-Pierce Scale**  
The musical experience includes perceptual attributes of sound, cognitive understanding of harmonic and melodic structures, and affective responses to tension and release. How does the mind derive this complex musical experience from exposure to sounds? To address this question, naïve listeners with no prior exposure to the Bohlen-Pierce scale were presented with series of melodies composed in the Bohlen-Pierce scale, and were given pre- and post-exposure tests assessing grammar-learning, statistical sensitivity, and preference for melodies. Results show that given exposure to small numbers of melodies, listeners recognized and preferred melodies they had heard, but when exposed to large sets of melodies, listeners learned the

underlying statistical regularities of the novel music. Event-related brain potentials in response to chords in the B-P scale revealed two components of cortical activity which are sensitive to sound probabilities and individual differences in learning. Results suggest that the human brain rapidly picks up on structural and statistical properties of sounds, and that neural mechanisms enabling statistical learning may be fundamental to the musical experience.

# Abstracts

March 8, 2010  
Williams Hall  
New England Conservatory

**Richard Boulanger: Strategies and Solutions**  
Singing, Playing and Discussing Excerpts from my Bohlen-Pierce Compositions – Solemn Song for Evening (1987), With Friends at C (2007), and I Know of No Geometry (1990 rev. 2010).

**Georg Hajdu: Starting Over – Chances Afforded by a New Scale**  
A new scale, such as the Bohlen-Pierce scale, based on an interval other than the octave, brings about challenges that were mirrored in the development of Western music over the past 1000 years. Extrapolating from our experiences we can build analogies to musical theories that emerged from this lengthy evolutionary process and thus test some of the underlying assumptions. These findings can be the point of departure for building a new musical system, an attempt which in many ways resembles the budding field of synthetic biology. In my presentation I will, in the context of my piece Beyond the Horizon, talk about spectral matching of scale and spectra, the establishment of a new theory and, most importantly, demonstrate a new notation environment capable of representing music in different notational contexts.

**Paul Erlich: Commas, Temperaments, and Scales, with particular attention to the ‘BP diatonic’**  
My Xenharmonikon 18 paper \_A Middle Path between just intonation and the equal temperaments\_ shows how any “comma” or small JI interval can be “tempered out” and in the process define a whole (often unique) series of musical scales rich in consonant harmonic resouces. Of particular importance to Western musical history is the syntonic comma (81:80), the system in which it is tempered out (meantone), and the series of scales (pentatonic, diatonic, chromatic) that arise naturally when building said system. However, there are dozens of other viable choices for a comma to temper out, and many of these result in completely non-traditional series of scales nonetheless fairly rich in consonant harmony.

The BP diatonic scale and related constructs similarly arise when starting with a JI system that omits prime 2 and only uses primes 3, 5, and 7; tempering out the comma 245:243; and generating the resulting tuning system. My talk will illustrate a few particular, very slightly different ways of doing this. Along the way I’ll illustrate the harmonic resources of the BP diatonic scale with a lattice, and show how this lattice is “broken” when one does not temper out

245:243 — i.e., certain BP diatonic chords will fail to be consonant, or at a minimum will require multiple, differently-tuned renditions of some of the same letter-name pitches to be available (ruining the integrity of the scale), when a tuning system is used in which 245:243 does not vanish. One can easily use this lattice to find a chord progression based on the BP diatonic that, when rendered in strict JI (preserving all common tones from one chord to the next), the progression will drift in pitch by 245:243 each time it is cycled through. These are analogous to the classic Western 81:80 “comma problems” identified by Benedetti in the 16th century and oft-discussed since then, but deserve to be more widely known and understood in the BP context. For example, 31-EDO and 41-EDO are both well-known for their good approximations to consonant intervals based on frequency ratios built from the prime factors 3, 5, and 7. If one attempts to render BP diatonic music in 31-EDO, however, one may experience some severe problems indeed, as 245:243 comes out as a whopping 39 cents in 31-EDO! However 245:243 vanishes entirely in 41-EDO, so the latter makes a fine tuning system in which to perform or compose BP diatonic music without any danger to its integrity.

**Ron Sword: Lecture and Demonstration on the Bohlen-Pierce Scale and Tuning systems**  
A presentation and lecture on the aesthetic and tactile challenges of the Bohlen-Pierce Guitar, and the introduction of a “new” and more practical instrument for the given scale.

An introduction and short discussion of the “Bohlen-Pierce Scales for Guitar” book, which segues into a brief theoretical information and brief history on the BP tuning. The Bohlen-Pierce Guitar is explained and shown on 6-string BP standard classical and Paul Erlich’s “Triple-BP” tuning, which offers additional odd harmonics. The mathematics behind each of the guitars will be shown, and how tunings can be derived on any string length division. An “A/B” listening test will be given as well in comparison to the Just Intonation Version of the Scale.

Finally, the “9-string BP Electric” will be introduced and explained as well with a short performance on each of the guitars during the lecture. The scores for the performances of “Bohlen-Pierce Timbre Etudes I, II, and IV” for BP Classical Guitar will be available for the concert, as well as copies of the “Bohlen-Pierce Scales for Guitar” Books and Guitars at the symposium.

**Todd Harrop: Dissonance and the Bohlen-Pierce Clarinet**  
The clarinet is especially suited to play music in the Bohlen-Pierce scale due to its physical and acoustic properties. It is simpler to construct and play than the conventional clarinet, and the attenuation of even harmonics adds little to the perception of dissonance for intervals based on odd number ratios. This paper will introduce the B-P scale and clarinet, then compare the dissonance curves of various intervals and timbres by examining regions of partials in relation to the ear’s critical bandwidth.

**Larry Polansky: A Mathematical Model for Optimal Tuning Systems**  
In this paper we propose a mathematical framework for the optimization of tuning systems. We begin with an informal definition of “tuning system.” We then propose five general constraints that seem common to their evolution. The central idea of this paper is the quantification of those constraints in terms of a set of numerical parameters. Given a choice of parameter values we use appropriate optimization methods to produce an optimal tuning for a specific set of values. Finally, we consider some historical and Javanese tunings from this perspective, and use the framework to generate a few examples of novel tuning systems.

# Abstracts

March 9, 2010  
Goethe Institute Boston

**Manfred Stahnke: The Bohlen-Pierce Scale in the Context of Just Intonation**

The Bohlen-Pierce-Scale is an example of a new construction of a musical scale on the basis of simple number ratios. But looking at it closely, it shows up to be also interesting in a completely different field: that of equally distributed “exotic” intervals, defined by its basal step distance of roughly 146 cents. This ambiguity contributes to the conceptual richness of the BP scale. I will compare it to the concept of Harry Partch’s “Just Intonation” with intended simple number ratios 11 limit, in a non-equal framework of his 43 step “scale”, and with my non-octaving scale (12th root of 1.9560685), first used in my duo for scordatura harp and synthesizer “Partch Harp”.

**Stephen Fox: The design and construction of Bohlen-Pierce clarinets and other wind instruments**

This lecture/demonstration outlines the conception, design, construction and development of the first Bohlen-Pierce wind instruments – clarinets of various sizes, recorders and potential future types – from the inception of the current project in 2003 up to the present day. Design-related topics discussed include the choice of a central pitch standard, adapting an existing design to a different tuning scheme, laying out tone holes using a combined mathematical/empirical approach, and keywork arrangements. The particular suitability of clarinet-type instruments, which overblow at the twelfth, is noted, along with, conversely, the potential problems with instruments that overblow at the octave. The issues encountered by the player – e.g., fingerings and modification of ingrained habits of pitch recognition and pitch adjustment – are also mentioned.

**Elaine Walker: Continuing Research on Perception and Performance of the Bohlen-Pierce Scale**

I will give an overview of my work with the Bohlen-Pierce Scale over the years, starting with how Dr. Richard Boulanger introduced me to the tuning and how it turned out I was a fan of John R. Pierce all along, to my research at NYU during my Masters studies when I got to know Heinz Bohlen. Then I will talk about what I am working on now, with the hexagonal keyboard layout I developed, outlining chord progressions and fingerings on the keyboard, and composing new music.

**David Lieberman: the SPACE between NOTES**

The limits of architectural space are set by the physical constraints of containment and are, more often than not, defined by the dimensional register of a visually perceived and conventionally accepted system of measurement and representation. The proposition rests in the assertion that aural perception is a more intuitive and natural means by which we both perceive and occupy spatial constructs. In an appreciation of the both conscious and unconscious recognition of distance and dimension, volume and proportion, and material resonance, it is the aural which critically identifies the emotive qualities of architecture in its expanse and in its intimacies. Material resonance responding to the choreographic movement through space, complete with moments of pause and the frictions of engagement with others, is registered though aural cognition. Sound, or rather acoustics, must be a fundamental principle of design conception and development of an architectural idea. The music of architecture is evident in its articulate resolution.

The paper is situated within a larger body of work considering architecture as a performing art, not a fine art, in that understanding of its composition and intent is a continually evolving and eroding condition as perceived through the tenancy and occupancy of its use. The thesis is not only a pedagogical principle of teaching, but is set as a condition for an inclusive and responsible theory to be incorporated in practice.

**Gayle Young: Cross-Current**

Young will demonstrate the pitch structures from which Cross-Current is constructed, of which there are two types. The first are groups of pitches whose ratios share a prime number, the second are ratios which, when added to one another, form a unison with a different ratio. For instance, two 9/7’s (81/49) form a unison with 5/3, both ratios falling within ten cents of a pitch in the Bohlen-Pierce scale.

The changing directions of water flow shape the clarinet part, and the movements of river-bottom rocks across the screen shape the percussion parts, the pitch structures shifting with the changing directions of movement in the video. James Tenney’s concept of harmonic space is taken rather literally here, as if the video itself were illustrating the vectors of a diagram of harmonic space. Young will also discuss the role of Reitzenstein’s video in the context

of Earle Brown’s composition December 1952, for which Brown originally intended to build a horizontal motorized mobile, to which the musicians would respond.

**Johannes Kretz: HOQUETUS II**

The composition “HOQUETUS 2” for two Bohlen-Pierce clarinets and electronics uses a harmonic pitch system on the basis of the Bohlen-Pierce scale as implemented in the Bohlen-Pierce clarinets by Stephen Fox ([http://www.sfox-clarinets.com/BP\\_sale.html](http://www.sfox-clarinets.com/BP_sale.html)). The means of live electronics are used to emphasize the properties of this harmonic pitch system and to make its correctness more evident to the listener.

**Arturo Grolimund: A New Instrument – a New Scale**

The first pan flute tuned to the Bohlen-Pierce scale was built in November 2009 by Ulrich Herkenhoff in Munich, Germany. The instrument was built based on my suggestion with the support of Heinz Bohlen.

Practicing with this instrument, I made the following observations: Intervals 8 and 5 sound better than you would expect from their more complex numerical ratios. 8, 5 and 13 – the interval of the tritave – are Fibonacci numbers. If we continue creating intervals according to the Fibonacci series, we get a new scale that is very close to the normal 12-set diatonic scale. So there are scales in BP that are more consonant and others provide a better scale design. If we follow this approach we can create other microtonal scales to test this quality.

**Kevin Foster: Algebraic Aspects of the Bohlen-Pierce Scale**

Group Theory and Galois Theory are applied to illuminate structural characteristics of Bohlen-Pierce scales, especially in comparison to the standard diatonic and chromatic scales.



# Concert 1

Sunday March 7, 2010

Fenway Center  
Northeastern University

### Todd Harrop

**Calypso for 2 Bohlen-Pierce clarinets** (2008)  
TranSpectra Ensemble; Amy Advocat, clarinet; Tilly Kooyman, clarinet; Todd Harrop, percussion; Rick Sacks, percussion; Yvonne Ng, dance

### James Bergin

**Liebesleid** (2010)  
Amy Advocat, BP clarinet

### Roger Feria

**Re: Stinky Tofu for Bohlen-Pierce clarinet and bass clarinet** (2010)  
Amy Advocat, BP clarinet  
Stephen Davidson, bass clarinet

### Anthony De Ritis

**Five Moods for Bohlen-Pierce clarinet and tape** (2010)  
Amy Advocat, BP clarinet

### Stratis Minakakis

**Anacharsis I for Bohlen-Pierce clarinet, violin, percussion** (2010)  
Amy Advocat, BP clarinet  
Samantha Bennett, violin  
Gary Weaver, dumdek

- Intermission -

### Peter Hannan

**No brighter sun: no darker night for chamber ensemble** (2009)  
TranSpectra Ensemble; Neal Evans, conductor; Marion Samuel-Stevens, soprano; Amy Advocat, clarinet; Tilly Kooyman, clarinet; Shane Neill, cello; Rick Sacks, mallet-KAT; Yvonne Ng, dance

### Julia Werntz

**Imperfections for Bohlen-Pierce clarinet** (2010)  
Amy Advocat, BP clarinet

### Katarina Miljkovic

**For Amy for clarinet & electronics** (2010)  
Amy Advocat, BP clarinet

### Clarence Barlow

**Pinball Play for 4 Bohlen-Pierce clarinets** (2010)  
Amy Advocat, Tilly Kooyman, Ákos Hoffmann, Nora-Louise Müller, BP clarinets

# Program Notes

### Todd Harrop

**Calypso for 2 Bohlen-Pierce clarinets** (2008)  
The music was inspired by the period in Homer’s tale when Odysseus languished for years on Calypso’s isle. Features include characteristics of ocean waves, the voices of Maria Callas and Penny Rolinski, another singer and dear friend of mine, and synthesized chimes modelled after our BP chimes but adjusted so their partials are in tune with the BP scale. I am grateful to Yvonne Ng and Rick Sacks for contributing dance and theatre by embodying the spirit of the music.

### James Bergin

**Liebesleid** (2010)  
Accustomed as I am to using a 72-note octave with intervals as small as a twelfth-tone, writing for the Bohlen-Pierce clarinet presented an intriguing challenge! I searched for expressive and fresh melodic intervals, and tried to shape them into long, legato phrases that would allow the clarinet to sing.

### Roger Feria

**Re: Stinky Tofu for Bohlen-Pierce clarinet and bass clarinet** (2010)  
The ‘stinky tofu’, one of the most recognizable street dishes in Taiwan, and one of my favourite childhood memories...

The production of such a delicacy requires one to first marinate fresh and firm tofu in a special brine (traditionally consisting of carefully proportioned rice water, aged amaranth/mustard green, bamboo shoots, Chinese herbs, shrimp or fish remains, and salt) at room temperature for a period of a few days up to a few months. There are many ways to prepare this delicacy: it can be eaten cold, stewed, smoked, steamed, grilled, but most commonly, as the Taiwanese prefer – fried!

This piece is my reaction to, and may I say, uncontrollable urge to want to have some fun with the strange yet familiar instrument of the BP clarinet. The idea of miniatures is an extension of my earlier piece, “Lines” for string trio, essentially a study of five short and concise microtonal miniatures. Simpler instrumentation and musical objects are employed not only as a metaphor to my inspiration

– the humble tofu – but more importantly, to allow the uninterrupted interplay between the conventional tuning and the Bohlen-Pierce scale. This interplay of familiarity and peculiarity is achieved through the combination of the two clarinets and is realized through simple musical objects of long held notes (mvt. I), repeated short, oscillating notes (mvts. I & II) and short melodic motives (mvt. II), allowing the audience to ‘indulge’ in the delicious strangeness of the combination of these two distinct tunings.

### Anthony De Ritis

**Five Moods for Bohlen-Pierce clarinet and tape** (2010)  
“Five Moods” are five short pieces, all one minute or less, for Bohlen-Pearce (BP) clarinet and tape. Special thanks to BP clarinetist, Amy Advocat, who allowed me to record samples of her playing her special clarinet at Northeastern’s recording studio, and thanks to Brian Dixon, for recording and editing the samples. Together we recorded short attacks, long tones (soft and loud) and various special effects, and built a mini-library, which, at Georg Hajdu’s suggestion, we will make available to the BP community.

This is my first endeavor with the BP scale, so these short works are really explorations. I appreciate your indulgence in listening to these chords, beats, attacks, and peculiarities that I felt exploited the best of the scale and this newly-formed instrument.

### Stratis Minakakis

**Anacharsis I for Bohlen-Pierce clarinet, violin, percussion** (2010)  
Anacharsis was a 6th-century Scythian philosopher who traveled to Solon’s Athens. The first foreigner to receive Athenian citizenship, he was highly regarded for his study of Greek institutions and was reputedly an outspoken advocate of restraint and moderation. The personage of Anacharsis is used as a metaphor referring to the interlocation between two different ‘pitch cultures’, represented by the two different intonation systems used in the Bohlen-Pierce clarinet and the violin parts. One is attempting to ‘translate’ the language of the other, while the dumbek comments on and regulates their mutual exchanges.

### Peter Hannan

**No brighter sun: no darker night for chamber ensemble** (2009)  
The text I’ve written for these songs is a paraphrase and



update of the poems that form Mahler’s Kindertotenlieder. The idea for this work came to me when I was in Lesotho in December 2008 for the second time in 2 years, accompanying my wife who was working as a doctor in an HIV/AIDS clinic. I’ve experienced firsthand the situation in a country that is at the bottom of the world economic scale, has a disastrous rate of HIV infection and a country whose population has essentially been left to die by the rest of the world. Children of course are hugely affected in many different ways. The texts represent something of my experience there.

**Julia Werntz**  
*Imperfections for Bohlen-Pierce clarinet* (2010)  
I wrote Imperfections for Amy Advocat in January of this year. I had a limited amount of time for composing, and I was using an unfamiliar scale, so out of necessity I kept the piece short, and conceptually simple.

I took a straightforward linear approach, exploiting the special expressive melodic qualities of this scale which has only one “step” (the lovely 146 cents interval) and “skips” of rather ordinary sounding minor thirds (293 cents) and strikingly large and evocative major thirds (439 cents). I am used to composing microtonal music using 72 equal divisions of the octave (72 edo), which allows me seven kinds of minor third, seven kinds of major third, and so on. It was a welcome challenge to limit my melodic choices this way.

To enable myself to compose with a familiar vocabulary, I simply conceived of the Bohlen-Pierce scale as a subset of 72 edo (with the Ezra Sims symbols I’ve used for many years). Using 72 edo I was able to approximate Bohlen-Pierce temperament always within eight cents of accuracy. When the piece was finished, I converted it back to the BP clarinet notation.

Imperfections is a simple melodic expression, as well as an expression of the Bohlen-Pierce scale—from the point of view of a Bohlen-Pierce newcomer. It makes statements and asks questions the way melodies typically do, while it also features structural aspects of the scale, such as the “true” consonances of the 3/1 and 5/1 intervals, as well as the “false” octaves, fifths and thirds. It is a short homage to another way of thinking about music.

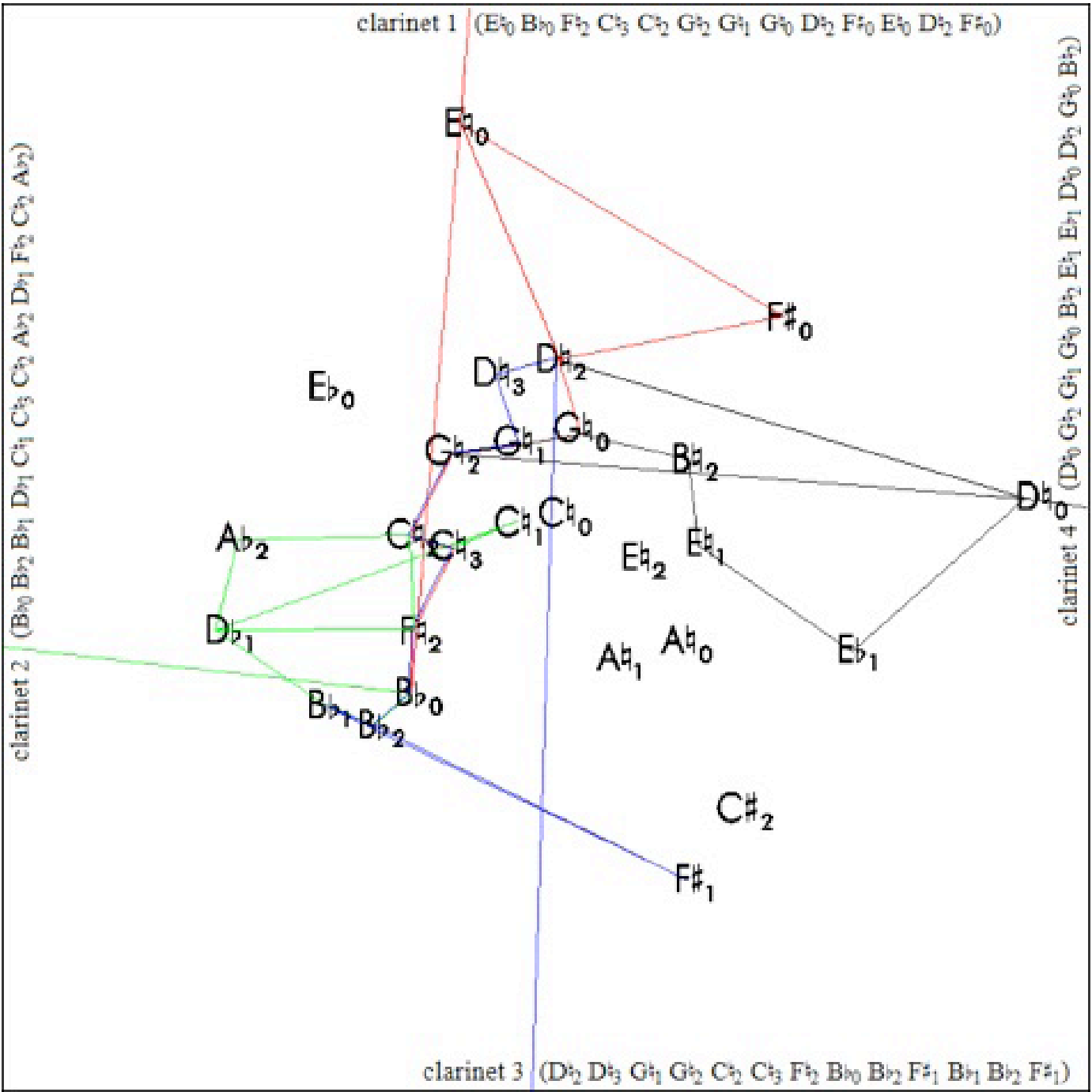
**Katarina Miljkovic**  
*For Amy for clarinet & electronics* (2010)

The piece is my first attempt to compose in Bohlen-Pierce sound spectrum. After initial trials, beautiful sonorities began to emerge. All aspects of the musical structure, pitch, time and rhythm are based on the proportions 1:3:5:7:9:15. The center of symmetry is A 440, with duration of 1 second. The number of sound structures, repeating throughout the piece, are relating to the center and mirroring each other. Electronic part is generated in Mathematica, a perfect tool to get the exact proportions, and then processed. The composition is written for Amy Advocat whom I’ve known first as an undergraduate student at NEC and then as a brilliant professional performer.

**Klarenz Barlow**  
*Pinball Play for 4 Bohlen-Pierce clarinets* (2010)  
In 1978 I developed a method for quantitatively establishing the harmonicity of an interval of pitch, given the relationship of its frequencies as a ratio. For instance, according to this system, the 2:3 perfect fifth is 0.273 harmonic, the 4:5 major third 0.119 etc. This method can convert a scale given in cents from a designated tonic into ratios related to that tonic. The intrascalar intervals’ harmonicies can then be multi-dimensionally scaled, as in the square-shaped map below: the more harmonic the relationship of two given pitches, the closer together they are in the map.

This diagram (opposite page) shows the multi-dimensional scaling of the rationalized Bohlen-Pierce (“BP”) scale spanning two adjacent perfect twelfths. As the main part of the compositional process, four straight lines are repeatedly projected into the square, each from a different side. If a line meets one of the notes of the scale, the note is sounded and the line is generally deflected to a spatially nearby note, which is also sounded. This process is repeated until a path is re-traversed or the line exits from the diagram. These constantly varying trajectories, not unlike those in a pinball game, generate melodies distributed among four clarinets, one for each side of the diagram. The four clarinets repeatedly play a new melody starting at multiples of 4”, 3”, 3 ” and 2 ” respectively. The melodies initially have a length of about half a second but gradually get longer. The diagram also shows the final four melodies of the piece.

The word “Play” in the title, a play on words, refers to the obvious “game” and “dramaturgy” and indirectly to my melodic “prey” or “catch”, which is “prooi” in Dutch (the BP scale was co-invented by Kees van Prooijen).



**Example by Klarenz Barlow**  
This diagram shows multi-dimensional scaling of the rationalized Bohlen-Pierce scale spanning two adjacent perfect twelfths.

# Concert 2

Monday March 8, 2010

Fenway Building, rm F12  
Berklee College of Music

THE FIRST SET
<b>Richard Boulanger</b> <i>I Know of No Geometry</i> for solo Radio Baton and Csound5 (1990 revised 2010) Richard Boulanger, Mathews Radio Baton
<b>Max Mathews and John R. Pierce</b> <i>Sea Songs Phasered</i> (1963 and 2010)
<b>Steven Yi</b> <i>Reminiscences</i> (2010)
<b>Curtis Roads</b> <i>Purity</i> from <i>Clang-tint</i> (1994)
<b>Louis Cohen</b> <i>Homage to Cage 2</i> (quadraphonic electronic composition employing Bohlen-Pierce temperament) (2009) Lou Cohen, Laptop Operator
<b>John ffitch</b> <i>Universal Algebra</i> (2010)
<b>John Mallia</b> <i>The Larches</i> (2010) John Mallia, laptop
<b>David Wessel</b> <i>BP Compatible Spectra</i> (2010) David Wessel, The CNMAT SLABS Performance Interface & Laptop
THE SECOND SET
<b>Arturo Raffaele Grolimund</b> <i>Folk Tune - Improvisation</i> (2010) Arturo Raffaele Grolimund, Bohlen-Pierce-Pan Flute
<b>Ron Sword</b> Compositions for Bohlen-Pierce guitar (2009-2010) Ron Sword, guitar
<b>Elaine Walker</b> <i>Love Song</i> Elaine Walker, Sonome/voice; Richard Boulanger, Sonome/BP piano; Daniel Sedgwick, Percussion; Marji Gere, Violin
<b>Stick Men</b> Elaine Walker, BP-tar

Richard Boulanger, BP classical guitar/Sonome/BP piano; Ron Sword, 9-string BP electric guitar
THE THIRD SET
<b>Northeastern University Music Tech Students</b> <i>Half the Plate</i> (2010) Andrew Cush, Dean Russell, Edward Young, Ian Battenfield Headley, Zachary Zukowski, laptops
<b>Sofia Borges</b> <i>Ilustre Desconhecido</i> (2010)
<b>Constantin Basica</b> <i>If some kind of intelligent life form would find the Voyager Golden Record that we sent in space and their audio playing device would “translate” everything by default in Bohlen-Pierce scale, then...</i> (2010)
<b>Jose Dario Quiñones</b> <i>“BigPot” for BP-Scala</i> (2010)
THE FOURTH SET
<b>Jinku Kim</b> <i>Color Me Grey</i> (2010)
<b>Jacob Joaquim</b> <i>Fragments</i> (2010)
<b>Tim Lukens</b> <i>Permutations</i> (2010)
<b>Diane Douglas</b> <i>Spectrum of the Last Eclipse</i> (2010)
<b>Mike Moser-Booth</b> <i>A Place Between Dark and Light</i> (2010) Mike Moser-Booth, guitar & laptop
<b>Adam Shechter</b> <i>BP Piscium Star Fragments</i> (2010) Adam Shechter, Laptop
<b>Seiya Matsumiya</b> <i>The Melting Sun</i> (2010)

Concert 2 MONDAY
Program Notes
THE FIRST SET
<b>Richard Boulanger</b> <i>I Know of No Geometry</i> for solo Radio Baton and Csound5 (1990 revised 2010) 1. Introduction to Geometry 2. Fractal Geomentry 3. Euclidean Geometry 4. Geometric Solution
This was one of the first compositions composed in the Bohlen-Pierce scale. It is dedicated to John Pierce - the grandfather of computer music and one of the co-inventors/co-discovers of this remarkable tuning system. It’s four movements showcase the evocative and melancholy harmonies and timbres and the sweet melodies that John personally revealed to me when he introduced me to his remarkable tuning system and invited me to compose in it. To return his special gift of friendship and encouragement, this work humbly tries to reveal some of the tuning’s inherent beauty, and to channel some of John’s radiant and nurturing spirit.
The piece is performed on a Radio Baton - a wireless 3D MIDI controller developed by Max Mathews - the father of computer music. Max was a great friend of John Pierce (he introduced us to each other) and he and I have collaborated and performed together for years now. I am quite proud of the fact that the radio baton that I am playing tonight is model # 1 and is named: “The Boulanger”. It uses two radio transmitters - tuned to 38K and 50K; I move these two batons over a tabletop (actually an FM receiving antennae) to register beats, activate triggers, and to transmit continuous MIDI controller messages. The program that interprets these gestures, written by Max Mathews, is called “The Conductor Program”. I like to think of it as an expressive, real-time, step-sequencer. The notated score is converted into ASCII and written in a text file consisting of letters for notes and dots for durations.
The 2010 version of the composition features a new 4-channel Csound orchestration.
<b>Max Mathews and John R. Pierce</b> <i>Sea Songs Phasered</i> (1963 and 2010) 1. Original Sound File (1963)

2. Phaser-Filtered Sound File (2010)

In 1963 John Pierce wrote the piece “Sea Songs” and synthesized the piece at Bell Telephone Laboratories using my Music 3 program. He used the then new random-noise unit generator to make band-pass noises, some with low frequency sounds and others with narrow band melodic sounds. In the 1980s at CCRMA Pierce made his version of the Bohlen-Pierce scale, a scale which has no octave but rather is based on a tritive (3:1) frequency ratio. Its chromatic 1/2 step is the 13th root of 3.

Sea Songs Phasered first movement is the original Pierce sound file. The second movement is the sound file filtered with a bank of 19 high Q phaser filters. The filters in the bank are tuned to the chromatic 1/2 steps of the Bohlen-Pierce scale. In the performance the sound file will be filtered in real-time on my MacBook Pro laptop. The entire filter bank will be transposed up or down Bohlen-Pierce chromatic 1/2 steps controlled from the computer key-board.

Steven Yi

*Reminiscences* (2010)

I often find myself lost in reminiscences of the past, observing not only the the memories themselves but also the experience of remembering those times. I am fascinated by how the happenings of today become the memories of tomorrow, how the passage of time transforms these memories, and how our relationships to these life events change as time passes. This piece is but a small meditation on the journeys within the times of our lives.

Curtis Roads

*Purity from Clang-tint* (1994)

Purity is one movement of my composition Clang-tint. The point of origin of Clang-tint can be traced to December 1990, following a visit to an installation of photography by the Starn twins at the Akron Museum of Art. These works combined large prints and transparencies with wood, tape, and metal to create three-dimensional sculptures. Several aspects of this work struck me. These artists integrated “sampled” (photographed) imagery with unusual materials and innovative methods of construction. The unconventional bending, cutting, and framing techniques “spatialized” their photography in three dimensions.

In the hour following my departure from the gallery, I con-

ceived a detailed design for a new composition. It would apply certain aesthetic concepts that I experienced in the gallery to the realm of sound. The primary source material for the composition would include sonic “photographs” or sampled sounds, as well as synthetic electronic signals. The spatial architecture of the work would be intimately bound with its inner form.

The piece would be organized in four contrasting movements, each concerned with a specific theme, and each with its own sound materials. The themes that I chose were: Purity, Filth, Organic, and Robotic.

Shortly after this experience, I received a commission for a composition from the Japanese Ministry of Culture and the Kunitachi College of Music. I decided that the realization of this new work, Clang-tint, would be an ideal project for the commission. Parts of the work were composed during residencies in Tokyo in 1991 and 1994, as well as my studio in Paris.

Purity is the first movement of Clang-tint. It explores a simple musical world of sinusoidal waves and harmonies derived from a microtonal scale. It begins with a contemplative section, as if played on an organ. Over time, this material transforms into a vast open territory of sine wave arcs, echoing in space.

Purity took over a year to complete. I spent much of this time exploring the harmonic possibilities of the Bohlen-Pierce scale. This is a spiraling 13-tone scale, which cycles at the 3:1 ratio instead of the usual 2:1 octave. I was attracted to the expressive potential of this scale, which is both more sweet and more sour than the common equal-tempered scale.

The piece premiered at the Kunitachi school in April 1994. The French premiere took place in December of that year at the Messiaen Auditorium of Radio France using 48 loudspeakers of the Acousmonium sound projection system of the Groupe de Recherches Musicale.

Louis Cohen

*Homage to Cage 2 (quadraphonic electronic composition employing Bohlen-Pierce temperament)* (2009)  
I combined several methods to produce this piece and I must say it was an emotional journey. I was one of Cage’s students in 1958 when he was teaching composition at

the New School in NYC. At that time while he was very supportive of whatever music his students wrote, he often spoke of his own methods. He had already completed “Music Of Changes”, and he explained a few times how he used chance methods to write that piece. I did not, immediately after that period, use chance the way he did, although I have used random methods a great deal in my music, but lately I have been thinking about Cage’s influence on me, and I decided to use similar techniques to those of “Music Of Changes” in “Homage To Cage 2.”

To begin, I created a “Pierce gamut,” based on the equal-tempered version of the Bohlen-Pierce scale: a series of frequencies ranging from slow audible clicks, through low notes, all the way to frequencies well above what I can myself hear. I then modified my laptop Csound improviser to play only the frequencies from that gamut.

Next I improvised and recorded about 30 minutes of source-sound, with as much variety as I could muster.

I then set up an OpenOffice spreadsheet in which I used two of its random number generators to determine the number of sections, the length of each section, the number of sound-events, the length of each sound-event, the output channel (1, 2, 3 or 4) and the portion of the 30-minute source-sound section to be used as the source for each sound-event. Using an audio editor, I then cut-and-pasted the sound-events into the final composition. Finally I adjusted the levels of each sound-event to suit my personal taste.

The cut-and-paste process was quite tedious, but I imagined Cage doing much the same thing and was comforted by this image. Christian Wolff told me, years ago, that Cage often listened to the radio while working this way -- but I didn’t do that.

John ffitch

*Universal Algebra* (2010)

Algebraic forms have interested me since I was first introduced to them aged 9. Recent fascination has been on the Henon equation and the complex patterns it makes. The piece Universal Algebra uses samples from the HKUIST gamelan to highlight the patterns, with the Bohlen-Pierce scale providing a harmonic framework. To this is added a few components of Jhaptaal (10 beats), and in deference to my tabla teacher, Tapan Roy, it ends with a Tihai.

The fixing of cultures, Chinese, Indian and Western is why I call it Universal, although properly this is the study of algebraic structures themselves, not examples.

John Mallia

*The Larches* (2010)

The Larches (2010) is a brief work composed of high frequency synthetic waveforms and soft-edged noise. I remember my Dad planting these small Larch trees when I was a kid. When I visit my parents’ home in Syracuse, it amazes me how big the trees have grown, and how delicate they still seem — filigree.

The frequencies used in this composition were derived from fragments of the justly tuned Bohlen-Pierce scale in various transpositions at intervals inherent to the structure of the collection. A scale based on an interval of 833 cents (a minor sixth, 1/6 tone sharp) is also employed as a recurring harmonic departure. Thank you to my longtime friend and colleague Julia Werntz for requesting this composition.

David Wessel

*BP Compatible Spectra* (2010)

The title is descriptive of the material and the compositional approach. The spectral content of the sounds is aligned with the Bohlen-Pierce scale. Both additive synthesis with hundreds of sinusoidal oscillators and sharply tuned filter banks with hundreds of resonators are used throughout the work. The performance is entirely live and no pre-recorded sounds or samples are used. The performance interface consists of 32 pressure sensitive touch pads designed and built at the Center for New Music and Audio Technologies (CNMAT) at the University of California Berkeley. Each of the touch pads affords intimate control over the transitions of spectral content.

Special thanks go to Rimas Avizienis, Adrian Freed, Andrew Schmeder, and John MacCallum for their assistance.

THE SECOND SET

Arturo Raffaele Grolimund

*Folk Tune - Improvisation* (2010)

The first pan flute tuned to the Bohlen-Pierce scale was built in November 2009 by Ulrich Herkenhoff in Munich, Germany. The instrument was constructed based upon a suggestion made by myself and with the support of Heinz Bohlen. As the pipes of a pan flute are closed at one end



there are only odd harmonics in the spectrum - this makes the instrument ideal for playing Bohlen-Pierce. As a flutist who usually plays the modern concert flute I see this as a great opportunity for the flute family. The improvisation will begin with a circle of fifth in BP and use a scale, which I call the Fibonacci Scale, with an interval structure very close to the normal diatonic scale. The play-back consists entirely of BP-pan flute sounds. This is the first time that a Bohlen-Pierce pan flute is played in public.

**Ron Sword**  
**Compositions for Bohlen-Pierce guitar** (2009-2010)

**1. Free-Improvisation on 9-string Bohlen-Pierce**  
This piece will demonstrate “Improvised music” played in the Bohlen-Pierce scale on a 9-string guitar tuned in thirds. The performance is fully conceptualized and improved upon in a linear fashion, in which the resulting direction will shift based on the circumstances of the evolving melodic and harmonic parameters of sound. Tonality will be demonstrated in the Bohlen-Pierce system, as well as various timbre changes, experiments with various effects like pre-signal reverbs, delay, square chorus, and different filters.

**2. Stretched-Chromatic Etude for 13-tone Bohlen-Pierce Classical Guitar**  
**(aka Bohlen-Pierce Timbre Study no. I: 3:5:7)**  
This piece will demonstrate a technique for the right hand which corrects the timbre for Bohlen-Pierce classical, for the desired effect of a “Stretched-Chromatic” scale to the third Harmonic.

**3. Stretched-Ultra-Chromatic Etude for 39-tone Triple Bohlen-Pierce Classical Guitar**  
**(aka Triple Bohlen-Pierce Timbre Study no. III)**  
This piece will demonstrate a technique for the right hand which corrects the timbre for Triple Bohlen-Pierce classical, for the desired effect of a “Stretched Ultra-Chromatic” scale with microtonal intervals and additional high odd harmonics 11, 13, 15.

**Elaine Walker**  
**Love Song**  
My mission since the early nineties has been to write microtonal music in the same style that I would otherwise use 12 tones for. I see no reason to treat microtonal scales, particularly equal tempered ones of a reasonable size, any differently than the 12 tone tuning, other than to

get to know each for its unique “flavor”. Since I normally write electronic pop of a strange brand, Love Song was a deliberate exercise to use more accessible parts than I normally do. I chose a familiar topic (love and heartache). I chose familiar sounds (piano, cello, flute). My intention in doing so was to allow the Bohlen-Pierce scale to stand on its own. Secondly, since the listener has familiarity to grasp onto, it was my hope that no one would even notice the strange, alien tuning.

**Stick Men**  
Stick Men was my first Bohlen-Pierce Scale composition. It was inspired by Dr. Boulanger’s early BP compositions. The piece portrays my initial unfamiliarity with BP, repeating simple lines over and over, letting them sink in, becoming more and more familiar, then gradually modulating and adding new motifs, while still feeling afraid to explore this new harmonic territory. I clearly remember the combination of absolute fear and awe that this tuning stirred in me. Gradually, minutes in, the music becomes more free with the tuning, embracing the dissonance along with its incredible tonality. Every BP composer must go through a similar process of noticing the “minor thirds”, then finally making the decision whether or not to embrace the “short octave” at some point, which I do to an extreme at the end.

THE THIRD SET  
**Northeastern University Music Tech Students**  
**Half the Plate** (2010)  
Half the plate is based on an essay by Oliver Sacks, written about a patient, Mrs. S, who had lost the ability and concept of ‘left”. The parallels between the Bohlen-Pierce Scale and Ms. S’s perceived reality struck us, as the scale is constructed of half the partials of the harmonic series and Ms. S was only able to perceive half the world. A reading of the text has been incorporated into our composition, the sequence of words of which becomes fragmented according to ratios governed by the Bohlen-Pierce scale.

The ensemble performs with Georg Hajdu’s network music performance software Quintet.net, which has microtonal playback built into it. During the performance, the players, synchronized by a clock, send control messages to a central server from which they are sent to a sampler playing back sounds on five channels which the performers have created themselves.

**Sofia Borges**  
**Ilustre Desconhecido** (2010)  
The Portuguese poet Eugénio de Andrade wrote: “The green of the highest bamboos is blue. If not the sky touches its branches.” The almost ‘instant’ link between the earth and the sky somehow illustrates the idea I had for this composition: establishing links between the most distant points. It’s not only about distances but also antipodes and extremes. On a first level I used the most elementary properties of sound as a starting point. On an intermediate level I established links between elements such as white noise against a single frequency or a concrete sound against an electronic sound. On an advanced level I used both aleatoric and algorithmic techniques. On every step I had the Bohlen-Pierce Scale as a common basis. To express this paradoxal synthesis for the name of the piece, I used a famous Portuguese oxymoron that means “Illustrious Unknown”.

**Constantin Basica**  
**If some kind of intelligent life form would find the Voyager Golden Record that we sent in space and their audio playing device would “translate” everything by default in Bohlen-Pierce scale, then...** (2010)  
The title is self-explanatory. (N.B. The quoted piece is not actually included on the Voyager Golden Record, but instead a similar one.)

**Jose Dario Quiñones**  
**“BigPot” for BP-Scala** (2010)  
Try to avoid big tensions in order to get the BigPot. Nice Sinus and eGuitar sounds that will keep you focus.

THE FOURTH SET  
**Jinku Kim**  
**Color Me Grey** (2010)  
Network Performance with LaunchPad/Monome and visuals.

**Jacob Joaquim**  
**Fragments** (2010)  
Fragments is the final product from a series of short etudes and generative instrument experiments conducted in order to gain an understanding of the Bohlen-Pierce scale. This direction emulates the way in which a hacker approaches the challenge of dissecting a piece of software or electronic device. The piece is composed, programmed and generated with the Csound computer music language.

The evolution of Fragments is documented at The Csound Blog: <http://csound.noisepages.com/>.

**Tim Lukens**  
**Permutations** (2010)  
Permutations is a composition written entirely in C. Synthesis techniques and digital signal processing are explored as ways to create interesting soundscapes and melodies. An overarching ABA form ties the piece together while many fibonacci points are accentuated. The composition allows the performer to select among different melodies and counter-melodies and move through them at their desired pace. This allows the melodies to be played out in many different permutations. The performer can play with rhythm and time to express the material. All the synthesis and DSP generated by the program.

**Diane Douglas**  
**Spectrum of the Last Eclipse** (2010)  
This is a studio piece composed for Csound and guitar being processed by Max/MSP and Ableton Live. The writing process was focused on layering together sheets of improvised sound through several different programs, all tied together through alternative tunings and hints of randomness.

The Csound orchestra was played live by passing midi information through Max/MSP. Each instrument has an infinite number of strange tunings based on the following formula:

$$F\left( n \right) = 8.1715799 * {y^{{n \over z}}}$$

Where n is the current midi note number being sent to Csound, y is the frequency ratio between the first and last note in a cycle, z is the number of notes in each cycle, and the constant is the base frequency of note number 0. In the equal tempered world, y = 2 for the octave ratio, and z = 12 because there are 12 notes in each octave. The Bohlen-Pierce tuning sets y equal to 3 and z equal to 13. However, by assigning y and z to continuous controllers in Max/MSP the piece is allowed to change tuning systems in real time.

The first instrument uses Scanned Synthesis, the second uses FM Singing Voice Synthesis, and the third one is based on Charles Dodge’s Harmonic Sweep instrument from the Csound Catalog. This instrument uses a basic oscillator, but its timbre will shift from one harmonic partial to another by sweeping through f-tables without re-initialization. The tuning of each partial is based not only on the

frequency of the root note coming from Max/MSP but also on the Fibonacci sequence. This determines the order of the added harmonics.

All instruments were then sent through three Max/MSP patches, also being controlled in real time. The first is called Canonic Delay, it continuously records audio into two pairs of expanding buffers. The longer one plays, the more detail and complexity will appear in one’s phrases. Each voice plays back its audio at a variable playback speed, which also changes the pitch of the sample. The effect can be similar to a fugue or a free canon, since mostly open intervals are used for pitch transposition. The second patch is called Granular Chorus. It uses granular synthesis to create five harmonizing voices out of incoming audio. Each voice scrubs backwards and forwards semi-randomly in a buffer creating layers of timbre out of small time-stretched chunks of each recording. Each voice can then be individually pitch shifted up or down in cents.

The last patch is a bank of resonant Phaser Filters written in C by Max Mathews. Each of these filters adds a single resonant peak to incoming audio. The frequency and decay time of each filter can be altered in real time to create the illusion of a constantly mutating resonant space. Incoming pitches are recorded in an expanding table, and then triggered and transposed randomly at a tapped tempo to play the filter frequencies melodically. All three of these patches function normally in equal tempered tuning, but they can each be shifted into microtonal tunings using the same equation described above, and this is the focus of the piece. It begins and ends in equal tempered tuning, but throughout the piece the instruments and patches use alternate tunings to move in and out of the Bohlen-Pierce scale, the equal tempered scale and other stranger ones.

Mike Moser-Booth

A Place Between Dark and Light (2010)

Though tuned to the Bohlen-Pierce scale, this piece uses a standard Western 12TET tuned guitar for input. The guitar is fed through a pitch tracker, which is then remapped to Bohlen-Pierce and used to trigger synths for the melody. The backing parts are mostly generated on the fly, with variations resulting from the guitar playing. The composition itself is loosely based on classical Indian music, as is the sound design, with some Western aesthetics. The exotic sound combined with the unusual, yet strong, harmon-

ic nature of the Bohlen-Pierce scale lends itself quite well to the melodic and harmonic concepts of Indian music.

Adam Shechter

BP Piscium Star Fragments (2010)

This is my first Bohlen-Pierce composition. I’m using Max-MSP in combination with Csound recorded into Logic, on OS X. The title of the piece refers to the planet BP Piscium, that I found about accidentally seaching the internet. This star has a giant disk of matter spinning around it as a result of a stellar collision and merging of two stars. Perhaps that could be a metaphor for this composition, which is an experiment in absorbing a new tonaity and system of organizing pitches, yet composing a piece that I consider familiar and my own. I’d like to thank Dr. Boulanger for his guidance and for presenting me with this opportunity.

Seiya Matsumiya

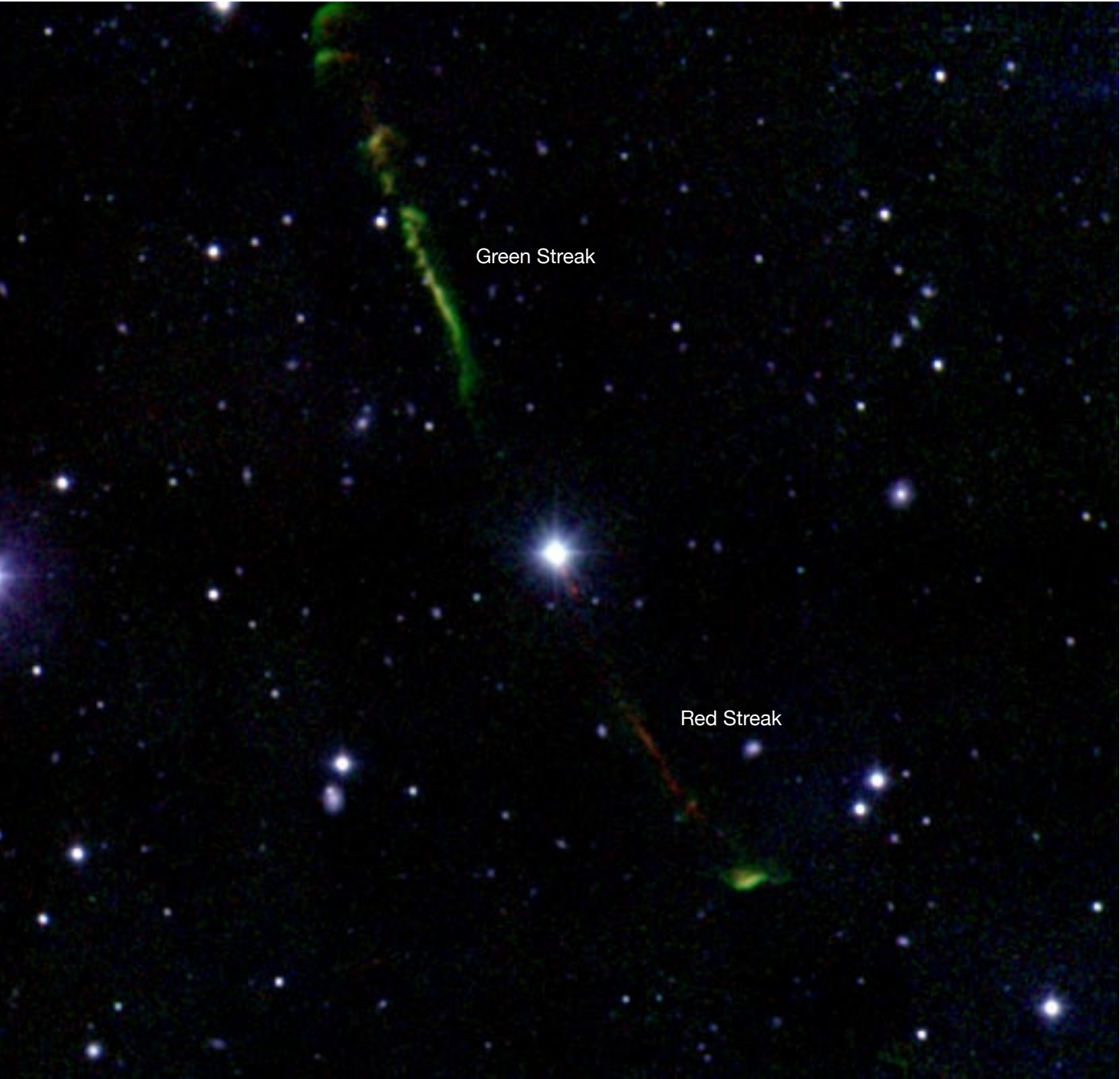
The Melting Sun (2010)

The Melting Sun is an ambient composition in the Bohlen-Pierce scale, whose tonality, timber, volume, and timing are determined algorithmically from a video of the sunset.

The sounds heard can be separated into two groups: the drones, and the melodies. Both groups feature three different Csound instruments that each correspond to various types of Red, Green, or Blue values extracted from the video. These data, combined with the data gathered from the position of the sun, control various parameters of the composition. Some of the data mapping choices are arbitrary, and some are obvious (i.e. the overall brightness controls the cutoff frequency of the global filter for the drones).

The composition is in the Moll II mode of the Bohlen-Pierce scale. The note numbers used for the drones and the melodies are predetermined, but the base frequency of the scale is not. In fact, the base frequency, or the tonality of the composition, shifts continuously throughout the piece with sun’s position, but the process is too slow to be perceptible—just like the movement of the sun itself. The three melodic instruments actually play the same long loop of notes, but at different timings and also in different tritaves. The timing itself changes continuously, and as the sun comes lower in the sky and causes an illusion that it is gaining speed, the notes are played more frequently. The composition currently uses previously recorded video material, but in the future it will allow the use of a visual live

feed of the sunset.



Example by Adam Shechter

The star BP Piscium (center), in the constellation Pisces. The green and red streaks are jets of gas shot from the star. The image was obtained using the 3-meter telescope at the University of California’s Lick Observatory. Credit: Marshall Per-rin, UCLA Astronomy (formerly UC Berkley), and James Graham, UC Berkeley Astronomy.



# Concert 3

Tuesday March 9, 2010  
Goethe Institute Boston

**Georg Hajdu**  
*Beyond the Horizon* for 2 Bohlen-Pierce clarinets and synthesizer in Bohlen-Pierce tuning (2008)  
Nora-Louise Müller, Ákos Hoffmann, BP clarinets  
Hubert Ho, synthesizer

**Manfred Stahnke**  
*Die “Vogelmenschen” von St. Kilda. Duo* for 2 Bohlen-Pierce clarinets (2008)  
Nora-Louise Müller, Ákos Hoffmann, BP clarinets

**Fredrik Schwenk**  
*Night Hawks – dark scene* for B clarinet and Bohlen-Pierce clarinet (2008)  
Nora-Louise Müller, Ákos Hoffmann, clarinets

**Pèter Köszeghy**  
*UTOPIE XVII (chochma)* for BP clarinet and CD (2010)  
Nora-Louise Müller, BP clarinet

**Peter Michael Hamel**  
*Die Umkehrung der Mitte* for 2 Bohlen-Pierce clarinets, viola, marimba and vibraphone (2008)  
Nora-Louise Müller, Ákos Hoffmann, BP clarinets  
Annette Klein, viola  
Rick Sacks, percussion

- Intermission -

**Owen Bloomfield**  
*When the Ravens Descend* for soprano voice, soprano and tenor Bohlen-Pierce clarinets (2008)  
Marion Samuel-Stevens, soprano  
Tilly Kooyman, soprano BP clarinet  
Stephen Fox, tenor BP clarinet

**Sascha Lino Lemke**  
*Pas de deux* for Bb clarinet, Bohlen-Pierce clarinet and electronics (2008)  
Nora-Louise Müller, Ákos Hoffmann, clarinets

**Arash Waters**  
*Little Duet* for BP Clarinet and Cello (2010)  
Tilly Kooyman, soprano BP clarinet  
Shane Neill, cello

**Johannes Kretz**  
*HOQUETUS II* for 2 Bohlen-Pierce clarinets and live electronics (2009)  
Nora-Louise Müller, Ákos Hoffmann, BP clarinets

**Rare Current**  
**1. Emily Doolittle**  
*Body of Wood* for mezzo-soprano, BP clarinet, cello, percussion

**2. Jascha Narveson**  
*Wire* for 2 BP clarinets, percussion

**3. Gayle Young**  
*Cross Current* for 2 BP clarinets, BP recorder, amaranth, percussion

# Program Notes

**Georg Hajdu**  
*Beyond the Horizon* for 2 Bohlen-Pierce clarinets and synthesizer in Bohlen-Pierce tuning (2008)  
“Beyond the Horizon” for two Bohlen-Pierce clarinets and synthesizer, written in 2008, is the result of my continuous preoccupation with the Bohlen-Pierce scale, which, characterized by its particular acoustic qualities, is an almost perfect fit for the clarinet.

What motivated this piece was the purely hypothetical and philosophical question of what the world would look like, if it consisted only of odd numbers, as is the case with the clarinet spectrum. But these are exactly the questions that inspire composers to create parallel worlds contrasting the omnipresence of 12-tone temperament. Since the Bohlen-Pierce scale is based on the just twelfth, or the tritave, as Pierce calls the octave replacement, it seemed a logical step to use a computer to construct a stretched spectrum whose 2nd partial lines up with the 3rd harmonic. This artificial, bell-like sound was slightly modified to reduce what we call sensory dissonance, which would result from intervals and chords. We thus achieve coherence between the spectral, harmonic and tonal dimensions, something we also encounter in traditional tonal music.

The text written by cosmologists Lawrence M. Krauss und Robert J. Scherrer (“End of Cosmology?”) and recited by Marcia Lemke-Kern, is an incentive to start thinking about the existence of a parallel (also tonal) world, that may eventually disappear from our view, if we don’t catch the moment.

**Manfred Stahnke**  
*Die “Vogelmenschen” von St. Kilda. Duo* for 2 Bohlen-Pierce clarinets (2008)  
Manfred Stahnke uses in his “Birdpeople of Saint Kilda” the possibilities of (close-to) “Just Intonation” in the tempered BP scale (13th root of 3), see example. On the other hand, the 146 or 292 cents relations of fundamentals are explored, as well as chains of 146 cents steps, mostly in fast, bird-like figures. The “bird” aspect plays a major role in this piece: Please do NOT expect a well-balanced piece, neither in the sense of avantgarde music, nor in the sense of well-formed “songs.” It is more a music from a dreamed-of old community of people, as was the case



1

Fingering

Sound  
fundamental G

3 5 7 9 15 21 27

2

fundamental Bb (-7 C)

3 5 7 9 15 21 27

Example by Manfred Stahnke

This example shows the possibilities of (close-to) “Just Intonation” in the tempered BP scale (13th root of 3).

with the isolated people from St.Kilda in the remotest part of the British Isles. When they communicated with people from the mainland of Scotland, they always talked in a “choir” of voices. This community made a life together with the gulls, from which they took the eggs. The community was destroyed in the 30’s of the 20th century, when a mirror was taken to the island, and people started to recognize themselves as individuals.

Fredrik Schwenk

Night Hawks – dark scene for B clarinet and Bohlen-Pierce clarinet (2008)

Night Hawks, Dark Scene for Two Clarinets, conceived for Bohlen-Pierce clarinet and Bb clarinet, continues in principle the piece Folsom Street for alto flute and knocking sounds from 1994, at least in its atmosphere. In both cases, short developing motivic elements represent the dark and shady wastelands of abandoned industrial terrains as we know them from the film Stalker by Andrej Tarkowsky. In Night Hawks, the light spheres of dim, sooty gas lanterns gutter by way of the intonation of the two clarinets, playing in different tunings. With agitated gestures reminiscent of a dancing dervish, suddenly an argument breaks out as if two moths were competing for the favor of the sordid light. The harmonic basis for the composition are two “whole-tone scales”: one in the 12-tone equal tempered system, i.e. six whole-tone steps and the other in the sense of the tuning developed by Bohlen-Pierce, whose steps are a quarter-tone shy of the whole step. Hereby, the piece always starts and falls back onto common, minimally deviant tones just to start rasping again in terms of intonation.

Pèter Köszeghy

UTOPIE XVII (chochma) for Bohlen-Pierce clarinet and CD (2010)

The series “UTOPIE” which are exclusively written for solo instruments all have the common goal to exceed musical borders. In number XVII that is the point with the audio-physiological phenomenon with the Bohlen-Pierce clarinet itself.. Because of the novelty espacially for Western ears the music itself moves in a strange galaxy. To emphasize the speciality of these sounds I also use a CD to be played along during the piece.

„...and chochma emerges from nothingness...” (Job 28:12)

Chochma is one of the ten sepiroth of the Kaballa which represent the creative powers of god. Chochma has the meaning of „the potential of what is“ or „the potential to be“. It is in a state of constant flux between being and non-being.

Peter Michael Hamel

Die Umkehrung der Mitte for 2 Bohlen-Pierce clarinets, viola, marimba and vibraphone (2008)

(Mis)-Using the Bohlen-Pierce tone row derived from 1:3 relations as a traditional modal scale close to micro intervals of an ancient Indian Shruti mode, set in relation to the lowest empty string of the viola. Attempting to unite or combine compositional techniques (which had been thought in music history as different, divergent, if not opposed to one another) into an integral new whole:

- twelve-tone dodecaphonic structure
- modal-harmonic elements with micro intervals

- new playing techniques/noise-like intervals
- Pythagorean sonic environments based on overtones (harmonics) in allusion to „Bohlen-Pierce intervals“.
- assonance of diatonic and dodecaphonic intonation
- contrast of twelve-tone series and repetitive techniques.

Die Umkehrung der Mitte is dedicated to Georg Hajdu who turned me on to the Bohlen-Pierce intonation!

Owen Bloomfield

When the Ravens Descend for soprano voice, soprano and tenor Bohlen-Pierce clarinets (2008)

When the Ravens Descend is a work in three movements that is inspired by a poem of the same name by Rae Crossman. While the first two movements, Alpha and Ravens, were written in 2010, the third movement, Wanderer, was completed in 2007. Alpha and Ravens expands on the musical language used in Wanderer. While Wanderer is based around BP pitch sets, the other two movements combine those pitch sets into a mode that is used throughout in transposition. When the Ravens Descend explores the melodic, polyphonic, and heterophonic tendencies of the BP scale. Particulars such as tendency tones and the notion of a tonic are brought into relief. The outer two movements are instrumental, the first for soprano and tenor BP clarinets and the third for two soprano BP clarinets. The middle movement, Ravens, is scored for two soprano clarinets and contains Crossman’s poem sung by soprano voice.

The poem graphically explores the death of a deer after being hunted down by wolves and scavenged by ravens. While this is the surface text, the poem has an existential element that asks us about our own perspectives on mortality and the instance of death.

When The Ravens Descend

by Rae Crossman (published with permission)

what flits  
through the skull  
of the starving deer  
staggering  
out of the cedars  
onto the frozen lake  
legs buckling  
upwind of death  
nostrils crusted with ice  
breath in heaves

does the eye of the deer  
see  
the beak of the raven  
as it’s pecked  
from the socket and swallowed  
does the ear of the deer  
hear  
the raven’s call  
for the wolf  
to tear open the throat  
what leaps  
when the belly’s ripped  
into the ethereal forest  
what exhalation  
above the din  
from the rib cage perch  
what story now on the wind  
and  
what will flit  
through my skull  
when the ravens descend  
what will rise  
besides the steam  
when my guts  
are dragged out across the snow

Sascha Lino Lemke

Pas de deux for Bb clarinet, Bohlen-Pierce clarinet and electronics (2008)

“Pas de deux” combines the classical clarinet in B flat with a so called Bohlen-Pierce clarinet. This second instrument is tuned to a scale of equidistant steps measuring approximately 146 cents -almost the same size as a neutral second (inbetween a minor and a major second). For the composition of ”Pas de deux” I decided to “abuse” the newly built instrument, which was constructed to be able to play many intervals in fairly just intonation: Instead of using these pure intervals as the starting point, I combined the scales of the two differently tuned instruments; the ordinary chromatic scale and the Bohlen-Pierce-Scale, often using them for two very simple, simultaneously descending lines. As the steps of the Bohlen-Pierce-Scale are slightly larger than the chromatic scale, the Bohlen Pierce Clarinet will descend faster than the traditional Clarinet. To the resulting intervals I then added shadows of difference and summation tones, giving birth to a very particular world of microtonal harmony.

Apart from this concept, I also make use of the possibility of combining the pitches of both instruments, which only slightly differ from one another, in order to produce beat-ings. Then, of course, there are a few moments where the pure overtone chords (which the Bohlen-Pierce clarinet was actually built for) reveal themselves. These chords mostly appear taking the form fast arpeggios unplayable on normal clarinets. The title refers, on the one hand, to the idea of a duo of two very different instruments. On the other hand, I imagined some sort of shadow dance etude without any “music”, where no dancer is seen, but the sound of dancing feet and the dancers’ breathing can be heard.

**Arash Waters**  
***Little Duet for BP Clarinet and Cello*** (2010)  
“Little Duet for Bohlen-Pierce clarinet and Cello” consists of a free micro-tonal cello line, which colors the Bohlen-Pierce clarinet. Cooperation and interruption form a glimpse of the dualistic world.

**Johannes Kretz**  
***HOQUETUS II for 2 Bohlen-Pierce clarinets and live electronics*** (2009)  
The composition “HOQUETUS II” uses a specially developed harmonic pitch system on the basis of the Bohlen-Pierce scale as implemented in the Bohlen-Pierce clarinets by Stephen Fox. The means of live electronics are used to emphasize the properties of this harmonic system and to make its correctness more evident to the listener.

**Rare Current**  
*Created with support from the Region of Waterloo Arts Fund. Rare Current consists of three works by different composers incorporating video projection by multimedia artist Reinhard Reitzenstein; includes unique Bohlen-Pierce instruments: stredici (string instrument), tritavophone (percussion instrument)*

**1. Emily Doolittle**  
***Body of Wood for mezzo-soprano, BP clarinet, cello, percussion***  
*Commissioned with assistance from the Canada Council for the Arts*  
*Body of Wood* was written in collaboration with poet Rae Crossman and visual artist Reinhard Reitzenstein, two artists whose work I have known and admired for a long time. Using footage of trees from the RARE forest in Cambridge, Ontario (known as “Canada’s largest urban green space”),

Reitzenstein’s video explores the textures, lines and colours of the bark of the species of trees unique to this geographical zone. My composition reflects these textures and patterns in sound, while Crossman’s words give verbal articulation to the patterns that I am exploring musically and Reitzenstein is exploring visually. *Body of Wood* was commissioned by the Canada Council for the Arts, and first performed at the Open Ears Festival in Kitchener-Waterloo in 2009.

**2. Jascha Narveson**  
***Wire for 2 BP clarinets, percussion***  
*Commissioned with assistance from the Ontario Arts Council*  
This piece was written after seeing the accompanying video by Reinhard Reitzenstein, which focussed on the patterns found in the interplay between trees and old barbed wire fences in a nature preserve outside of Cambridge, Ontario. The visual repetitions of the barbs combined with the organic forms of the twisted wire and the trees suggested music that was at once repetitive and sinewy. This seemed like a good image to work with for a first foray in to using the Bohlen-Pierce scale, since to my ears its novel tuning contains both smooth and jarringly pointy combinations of notes.

**3. Gayle Young**  
***Cross Current for 2 BP clarinets, BP recorder, amaranth, percussion***  
*Commissioned with assistance from the Ontario Arts Council*  
*Cross-Current* features video by Reinhard Reitzenstein, combined with music by Gayle Young. The images of flowing water seen in the video are reflected in the sounds of clarinets, percussion, and strings, all tuned in the Bohlen-Pierce system.

The music is structured around the changing directions of the flowing water, and the movements of river-bottom rocks across the screen, the harmonies shifting with the transitions in the visuals. The pitches are organized using just intonation pitch ratios—as utonalities and otonalities as described by Harry Partch, and as dimensions of harmonic space as described by James Tenney, in which each dimension is characterized by a prime number in the pitch ratios. The musicians respond to the changing densities and textures of the video in a manner similar to that originally proposed by Earle Brown for his composition *December 1952*, where a motorized mobile was to be set on the piano, its movements followed by the performer.

# Bios

**Amy Advocat**  
**Clarinetist**  
Hailed as “dazzling” by the Boston Globe, Amy Advocat, clarinetist, is an avid performer of new music having performed with the Firebird Ensemble, Boston Modern Orchestra Project, The New Fromm Players at Tanglewood, Callithumpian Consort, Fifth Tier New Music Ensemble, Brandeis New Music, and the Second Instrumental Unit. She has also performed with the Boston Pops, Opera Boston, Boston Philharmonic, and the Virginia Symphony Orchestra. Ms. Advocat was a fellow at the Tanglewood Music Center for two summers and participated at the New York String Orchestra Seminar, Spoleto USA Festival, and Virginia Arts Festival.

Ms. Advocat was named the first recipient of the Boston Woodwind Society’s Harold Wright award and is a Hadar Foundation Scholar. She received her Bachelor of Music and Master of Music Degrees from the New England Conservatory, where she was a recipient of the Tourjée award; a scholarship awarded to one outstanding NEC graduate who returns for a second degree. Her principal teachers include Simon Aldrich, Thomas Martin, David Weber, William Wrzesien, and Craig Nordstrom.

**Clarence Barlow**  
**Composer/Researcher**  
Born in 1945, Clarence Barlow obtained a science degree at Calcutta University in 1965 and a concert pianist diploma from Trinity College of Music London the same year. He studied acoustic and electronic composition from 1968-73 at Cologne Music University as well as sonology from 1971-72 at Utrecht University. His use of a computer as an algorithmic music tool dates from 1971. He initiated and in 1986 co-founded GIMIK: Initiative Music and Informatics Cologne and served as chair for thirteen years. He was in charge of computer music from 1982-1994 at the Darmstadt Summer Courses for New Music and from 1984-2005 at Cologne Music University. In 1988 he was Director of Music of the XIVth International Computer Music Conference, held that year in Cologne. From 1990-94 he was Artistic Director of the Institute of Sonology at the Royal Conservatory in The Hague, where from 1994-2006 he was Professor of Composition and Sonology. Since 1994 he has been a member of the International Academy of Electro-acoustic Music in Bourges, France. At UCSB he functions as professor at MAT, the Music Department (as Corwin Endowed Chair and Head of Composition) and the College of Creative Studies.

His interests are the algorithmic composition of instrumental, electronic and computer music, music software development as well as interdisciplinary activities, e.g. between music and language, and the visual, and would welcome collaboration with MAT students in any of these fields.

**Constantin Basica**  
**Composer**

Constantin Basica was born in Bucharest/Romania in 1985. He received his Bachelor's Degrees in Composition and Orchestral Conducting from the National University of Music in Bucharest, having Dan Dediú, Doina Rotaru and Cristian Brancusi as his professors. As an Erasmus scholar he studied for one year at the University of Music and Theater in Hamburg with Fredrik Schwenk, Peter Michael Hamel and Christof Prick. He returned there in 2008 and started a Master's program in Multimedia Composition with Georg Hajdu and Manfred Stahnke.

Constantin's interests in music are very diverse, ranging from being a conducting teacher at the "George Enescu" High-School in Bucharest to having concerts with his electro/ techno band. His compositions include acoustic pieces for solo instruments, chamber ensembles and orchestra, a few of them being honored with prizes in Romania. Lately, he has been focusing on studying algorithmic composition, while trying to create his own electroacoustic pieces.

**Samantha Bennett**  
**Violinist**

Violinist Samantha Bennett is a student of Donald Weilerstein at the New England Conservatory, and was a former merit scholar at the Music Institute of Chicago with Almita and Roland Vamos. At age 11, she made her solo orchestral debut with the Central Iowa Symphony and has since soloed with many Midwest orchestras including the Des Moines Symphony. Samantha has performed in London's Wigmore Hall at the invitation of the Razumovsky Academy , and her quartet, the Ridere Quartet, was featured on the second season of From the Top's television program, Live from Carnegie Hall. Samantha has won honors and prizes both as a soloist and as a chamber musician, including the Union League Civic and Arts Competition, Walgreen's National Competition, Second National Violin Competition, Johansen International Competition, and Fischhoff National Chamber Music Competition.

**James Bergin**  
**Composer**

James Bergin is the executive director of the Boston Micro-tonal Society and the conductor of its permanent chamber ensemble NotaRiotous. His compositions include tonal and microtonal works for solo instruments, voice and chamber ensemble, chorus, piano and organ. Seufzer, for solo flute, and Kyrie, for baritone, viola, and cello, were performed on the debut NotaRiotous concert in November of 2006. His fugue for voices, "Surely, He Hath Borne Our Griefs," was performed in March of 2007 by the Cantilena Chamber Choir at their Berkshire Composers Concert in Williamstown, MA. Other works include Langmusik, for solo trombone, De profundis, for baritone and chamber ensemble, and Noli me tangere, for saxophone, percussion and string trio. Bergin began studying harmony with Joseph Maneri at the New England Conservatory in 1971. After leaving NEC to pursue music study on a private basis, he continued to work with Maneri for more than a decade, studying harmony, species counterpoint, fugue, and composition, using Arnold Schoenberg's pedagogical texts. In 1991 he returned to NEC to complete a degree in music theory with Maneri as his principal teacher. He concentrated on the study of microtones, began composing in 72-note equal temperament, and studied theory, orchestration, and ethnomusicology with Daniel Pinkham, Robert Cogan, Lee Hyla, and Robert Labaree. He currently lives in western Massachusetts, where he works for the music publishing firm of Broude Brothers Limited, composes, and teaches violin and viola on a private basis. He has served as a consultant to the string program of the Williamstown Public Elementary Schools, and this past January taught a winter study course in microtonal ear training, performance, and composition at Williams College.

**Owen Bloomfield**  
**Composer**

Owen Bloomfield completed his Master of Music in Composition at the University of British Columbia with Keith Hamel. His Bachelor of Music is from Wilfrid Laurier University where he studied with Peter Hatch and Glenn Buhr. He also earned a diploma in music from Cambrian College in Sudbury, Ontario.

Mr. Bloomfield's works have been performed by a wide variety of ensembles and soloists in Canada and the United States, including The New Arts Quartet, soprano Natasha Campbell, pianists Christopher Bowlby and Iwona Kaminska, and guitarist Kevin Ramessar. He is a founding member of the interdisciplinary ensemble SlanT as well as tranSpectra, a group dedicated to the performance and composition of music using the Bohlen-Pierce tuning system. His piece Wanderer for Bohlen-

Pierce clarinet duo is the world's first for that instrument and has been performed at the Open Ears festival in Kitchener, Ontario. Mr. Bloomfield has collaborated twice with Yukon writer Lawrie Crawford on the interdisciplinary stage projects Variations on Gestalt and Tilt!. These works have been performed in Vancouver, Whitehorse, Kitchener and Guelph. He has also had readings by the Penderecki String Quartet, Trio Phoenix and the Vancouver Symphony Orchestra. He is an instructor of piano, theory and composition at the Guelph School of Music and music director at St. Matthias Anglican Church in Guelph. He currently resides in Cambridge, Ontario.

**Heinz Bohlen**  
**Researcher**

Heinz Bohlen was born in 1935 at Krefeld in the Lower Rhine region of Germany. His father was a certified electrician, but forced by the depression in the late 1920s his parents ran a modest grocery business. Bohlen's early school years were disrupted by WW II and its wake, leaving him with practically no musical education. In 1961 he graduated from the Technical University Aachen (RWTH) with the equivalent of a M.Sc. degree in electrical engineering. Until 2004 he worked for leading companies in the vacuum electron device business in Germany, the UK and the USA as a scientist and in engineering management. He is still internationally active as a consultant on high-frequency vacuum electronics. He is author and co-author of numerous publications, mainly on klystrons and inductive-output tubes, and he holds several patents in that area.

Music entered Bohlen's life through the backdoor. In the early 1970s, when he was already married and a father of three, a friend who happened to be a graduate student at the Hochschule für Musik und Theater (HfMT) in Hamburg, introduced him to his composition teacher and other members of his class. The reason: they needed somebody able and willing to make free-of-charge recordings of their concerts. This task not only opened Bohlen's ears for music. It also confronted him with a question that his musician friends were reluctant to answer: Why was all this music using a scale that contained 12 exponentially growing steps within the compass of an octave? In the attempt to solve this mystery he discovered in 1972 an alternative scale that filled the framework of the perfect twelfth with 13 steps. Fifteen years later, somebody named this scale Bohlen-Pierce.

**Sofia Borges**  
**Composer**

Sofia Borges, born in Lisbon- Portugal began her music studies at age 11. Attend the Amateur Academy of Music/Lisbon and subsequently studied Percussion at National Conservatory - Lisbon where she also studied Analysis and Composition Techniques with Eurico Carrapatoso. The activity as a percussionist combined with her interest in ethnomusicology has led her to participate in concerts, festivals and conduct workshops in Portugal, Spain, United Kingdom, Ireland, Netherlands, Germany, Switzerland Poland, Estonia, Macau, Taiwan, Brazil, Australia and New Zealand, working with leading international artists.

After attending the School of Jazz Luis Villas-Boas - Hot Clube de Portugal she began in 2006 her composition studies at Escola Superior de Música de Lisboa (ESML). At ESML she studied Composition with Luis Tinoco, João Madureira, Sérgio Azevedo, among others, and Electronic Music with Carlos Caires. As part of her studies, she debuted her music in various editions of Peças Frescas Festival at Teatro S. Luiz/ Lisbon. In 2009 completed her degree in Composition getting the final exam the classification of 19 points out of 20. She had collaborated with NOL - Nova Orquestra de Lisboa and in 2008 premiered the piece "A part of every new Day – for Jazz Drums and live electronics" in the concert "Novos Ciclos por Segundo" - promoted by "Miso Music Portugal". In 2009 she successfully applies for the Master in Multimedia Composition at Hochshsule für Musik und Theatre Hamburg - Germany, where she is currently studying with Peter Michael Hamel, Georg Hajdu, among others. Comissioned by RDP / Antena 2 – Portuguese Broadcast she composes "D'Ouro sobre Azul" for solo Marimba, mandatory piece for the Young Musicians Prize 2010.

**Richard Boulanger**  
**Composer/Developer**

RICHARD BOULANGER was born in 1956 and holds a Ph.D. in Computer Music from the University of California at San Diego. There he worked at the Center for Music Experiment's Computer AudioResearch Lab (CARL) and composed the first ever CMUSIC composition entitled "Two Movements in C." Since then, he has continued his computer music research at Bell Labs, CCRMA, The MIT Media Lab, Interval Research, Analog Devices, and IBM. He has collaborated, concertized, lectured, and published extensively with Max Mathews (Radio Baton), Barry Vercoe (Extended Csound & most recently on the \$100 OLPC laptop - <http://laptop.org>), and John ffitch (Csound5). Boulanger has premiered his original interactive compositions at the Kennedy Center and appeared onstage



performing his Radio-Baton and MIDI PowerGlove concerto with The Krakow Philharmonic and The Moscow Symphony. His music is recorded on the NEUMA, Centaur, and Stanford University labels <http://csounds.com/boulanger>. Boulanger has been teaching at The Berklee College of Music for more than 23 years now, and his students are all over TV, Radio, Computer Games, Films. Currently, Boulanger is a Professor of Electronic Production and Design. His contributions and work have been recognized and honored with Berklee’s “Faculty of the Year Award” and previosuly with the “President’s Award”. He has published articles on computer music education and composition in major electronic music and music technology magazines, and has lectured worldwide. For the MIT Press, Boulanger has authored and edited “The Csound Book: Perspectives in Software Synthesis, Sound Design, Signal Processing and Programming.” For the past ten years, and with contributions from a number of the leading teachers, researchers, and programmers in the world, Boulanger has been working on another major textbook for MIT Press (3000+ pages) which will be out in the summer of 2010 and which is called - “The Audio Programming Book.”

### Louis Cohen

#### Composer

Lou Cohen has composed music since age 12. He studied mathematics at MIT, and has studied music privately. Composition teachers include John Cage, Ernst Levy and Alan Kemler. He studied harpsichord and early music performance practice with John Gibbons. He lives in Cambridge, Massachusetts, USA.

His most recent compositions are algorithmic and therefore computer-based. He is an active improvisor of electro-acoustic music, using a laptop computer powered by Csound. His collaborations with video artist Bebe Beard, and his own computer animations have been shown in many galleries throughout the United States, and in film festivals around the world. He is co-director of Opensound, a Greater Boston concert series featuring electro-acoustic improvisation.

### Andrew Cush

#### Composer

Andrew Cush is a composer and performer born in Severna Park, Maryland and currently residing in Boston. He is a third year BS candidate studying music with a concentration in music technology at Northeastern University. Andrew is currently interested in exploring the interaction between micro- and macro- time in music and using frequency ratios to create and

govern rhythmic relationships.

### Stephen Davidson

#### Bass clarinetist

Stephen Davidson is an emerging artist in Canada’s contemporary and improvised music scenes. In Vancouver he has performed with the Vancouver Symphony Orchestra, the Vancouver Minaturist Ensemble, behind open doors arts collective and Letter Four Quartet, and was featured as both composer and performer in the Sonic Boom and New Music in New Places festivals. In Montreal, he has been featured on the music series Mercredimusics, Mardi Spaghetti and Garbage Night, as well as in various McGill ensembles. Stephen recieved his MMus in bass clarinet performance from McGill university, where he studied with Lori Freedman.

### Anthony De Ritis

#### Composer

Composer Anthony Paul De Ritis, born on Long Island, New York, is currently Professor and Chair of the Music Department at Northeastern University in Boston.

De Ritis completed his Ph.D. in Music Composition at the University of California, Berkeley, where he studied with Richard Felciano and Jorge Liderman, and worked with David Wessel at Berkeley’s Center for New Music and Audio Technologies (CNMAT) (1992-1997). He received his M.M. in Electronic Music Composition from Ohio University under Mark Phillips (1990-1992) and his B.A. in Music with a concentration in Business Administration from Bucknell University, studying composition under William Duckworth, Jackson Hill and Kyle Gann, and philosophy with Richard Fleming (1986-1990). De Ritis engaged in summer study at the American Conservatory in Fontainebleau, France under Phillipe Manoury, Tristan Murail, and Gilbert Amy (1991, 1992), the University of Southern California (1990) and New York University (1989). De Ritis also holds a certificate in Internet Technologies and a Masters in Business Administration with an emphasis in high-tech. In 2006, De Ritis was named the Alumnus of the Year for the College of Fine Arts at Ohio University.

As a graduate student De Ritis contracted and managed 112 musicians for the American premiere of John Cage’s *Ocean 1-95* with the Merce Cunningham Dance Company, and scored the music for the Macintosh computer game, *Step On It*, which won the 1997 MacWorld Arcade Game of the Year. He is the founder and lead developer of the Online Conservatory, a collaboration between the Boston Symphony Orches-

tra and Northeastern University, which has been featured in the *New York Times*, the *Chronicle for Higher Education*, *Newsweek*, *Symphony* magazine and the *Boston Globe*. The Online Conservatory allows viewers to explore BSO programs in-depth before their performances; in 2005 it was declared a “best practice” in “integrated” or “left-brain” marketing by Forrester Research.  
www.bso.org/conservatory  
www.deritis.com

### Emily Doolittle

#### Composer

Canadian-American composer Emily Doolittle is Assistant Professor of Composition and Theory at Cornish College of the Arts in Seattle. She was born in Nova Scotia in 1972 and educated at Dalhousie University (BMus 1995), the Koninklijk Conservatorium in the Hague (Eerste Fase, 1998), Indiana University (MMus, 1999) and Princeton (PhD, 2007). She has written for such ensembles as Orchestre Métropolitain du Grand Montréal, Tafelmusik Baroque Orchestra, the Albany Symphony, Ensemble Contemporain de Montréal, the Motion Ensemble and Meduse, and such soloists as sopranos Janice Jackson, Patricia Green and Helen Pridmore, pianists Rachel Iwaasa and Ruth Rose, viola d’amorist Thomas Georgi and viola da gambist Karin Preslmayr. Her doctoral research was on the relationship between bird and other animal songs and human music, a field in which she continues to be active. Other interests include the traditional music of various cultures, community music-making, and music as a vehicle for social change.

### Diane Douglas

#### Composer

Diane Douglas was born in Vancouver, BC in Canada in 1986. She began studying piano at age 4 and as she grew, so did her love for mathematics. But a passion for music took over when she began playing guitar in a band and writing songs at age 13. It wasn’t until she discovered sound design and electronic music at Berklee College of Music that she rediscovered the beauty of mathematics and started combining it with music. She currently resides in Berkeley, CA working for Keith McMillen Instruments and hopes to go to graduate school to continue studying instrument design and performance.

### Paul Erlich

#### Theoretician

Paul earned a B.S. in Phnysics from Yale University in 1995, but also spent long periods of time in Yale’s, Harvard’s, and

NYU’s music libraries and the New York Public Llibrary’s Performing Arts branch, absorbing the writings of Harry Partch, Adriaan Daniël Fokker, Easley Blackwood, and countless other theorists, historians, musicologists, and psychoacousticians, while relentlessly experimenting with microtonal ideas and sounds on his own. He posted countless articles to the Tuning List and related internet discussion groups from 1996-2006, where he learned about Erv Wilson and many others who have been devoted to the field, and helped forge a thorough, new understanding of the nature and generalization of the diatonic scales -- as well as many related topics. He has published important papers in Xenharmonikōn 17 and 18 as well as independently and online. He hopes to write a book tying together many of these ideas, exhibiting many alternate tonal systems in detail but also probing deep methemathical foundations that underlie them, such as the duality between Projective Tone Space and Projective Tuning Space.

### Roger Feria

#### Composer

Roger Feria Jr., a native of Taiwan, completed a Master of Music in Composition at the University of Calgary, and has studied with Allan Bell, David Eagle, and William Jordan. He began piano studies at the age of three, and studied with Peter Turner and with Marilyn Engle at the University of Calgary. As a composer, Roger has won prizes in the SOCAN Competition and Land’s End Chamber Ensemble for his solo piano work and piano trio. In 2004, Roger was featured as one of the top 30 young composers in Canada, and had his trio performed at the Ottawa International Chamber Music Festival.

### John ffitch

#### Composer

John ffitch was born in 1945 in Yorkshire, and was educated at St John’s College, University of Cambridge, where he read Mathematics, and postgraduate Computing. His 1971 Ph.D. was in the creation of a computer algebra system and its application in relativity and gravity wave research. He was joint winner of the Adams Prize in 1975. After six years as a post-doctoral researcher in symbolic computation, with a sideline in solar-system astronomy, working with Professor R. A. Lyttleton, FRS, he spend a year at the University of Utah and eighteen months at Leeds before being appointed to his current post as Professor of Software Engineering at the University of Bath in 1980. He has wide computational interests, having worked in LISP, parallelism, simulation, linguistics and compilation; he is also an executive director of the software company

Codemist Ltd.

Following a chance encounter with Csound on the Internet about 1990 he revived his teenage interest in creating music, and for the last years has been a main maintainer and developer of Csound. Encouraged by Richard Boulanger he also returned to composing, and encouraging others with a series of musical projects, such as the Door Project. He is also a bad tabla player.

**Kevin Foster**  
**Mathematician/musician**

Kevin Foster lives in Bloomington, Indiana with his five cats. He teaches mathematics at Ivy Tech Community College and is a PhD candidate at Indiana University. His joyful but unremarkable musical past includes stints as singer/guitarist in a melodic-punk power trio, oboist in a community orchestra and alto clarinetist in a spoken word free jazz quartet.

**Stephen Fox**  
**Clarinet maker, clarinetist**

Stephen Fox is a clarinetist, saxophonist and clarinet maker based in Richmond Hill, Ontario, Canada. He is widely regarded as one of the world’s foremost makers of custom, hand-built professional clarinets. Born in England, Fox completed a master’s degree in physics at the University of Saskatchewan before earning a degree in clarinet performance. He began a career in instrument repair in 1985 and started making clarinets in 1990. Fox makes modern soprano, basset, and bass clarinets, and basset horns. In addition he makes tárogatós, and is one of only a handful of makers of reproduction historical clarinets in the world. In 2006 he introduced the world’s first Bohlen-Pierce clarinets. Fox clarinets are played by Toronto Symphony Orchestra principal clarinetist Joaquin Valdepenas, Canadian big band leader Don Pierre, klezmer artist Kurt Bjorling of the band Brave Old World, Norwegian clarinetist Terje Lerstad, Binghamton University music professor Timothy Perry, Swiss multi-instrumentalist Peter A. Schmid, and many others in in Europe, Japan, the United States, and Canada. Fox also teaches musical instrument making at the Musikk Instrument Akademiet in Norway. As an instrumentalist, Fox performs and records with the chamber music groups Riverdale Ensemble and Ossia.

**Marji Gere**  
**Violinist**

As an artist, Marji Gere has found a home at the intersection of the visual, musical, and literary arts. She collaborates

primarily with the Charlestown Working Theater and husband and fellow performer/composer Dan Sedgwick, but also her ensemble An Exciting Event on projects that combine storytelling, contemporary music and composition, and puppetry. Marji taught creative writing through Houston’s Writers in the Schools (WITS) and piloted a creative writing and photography project for fifth graders for WITS in partnership with Houston non-profit arts organization, Fotofest; now she maintains a private piano and violin studio in the Boston area, teaches violin and chamber music to fifth graders at the Chit-tick Elementary School in Mattapan, MA, and leads a workshop in puppetry, music, and creative writing at the Charlestown Working Theater. Marji received a Master’s in Arts in Education from the Harvard Graduate School of Education and Bachelor’s degrees in Violin Performance and English from the University of Iowa. As a fellow of the Fulbright Commission’s Cyprus-America Scholarship Program, Marji did action research in reconciliation through music, as it applies to the Cyprus peace process. Her most recent stint in Cyprus culminated in the first Apple Hill Bi-Communal Chamber Music Retreat, a weekend-long experience for twenty-five young musicians from all parts of Cyprus.

**Arturo Raffaele Grolimund**  
**Composer**

Arturo Raffaele Grolimund was born in Solothurn/Switzerland, and studied flute in Winterthur and Hamburg with K.H. Zöller, and had master-classes and private lessons with Jaunet, Nicolet, Graf and Galway.

He wrote instrumental and computer compositions as well as theoretical works about flute music by Bach and about fractals in music. Arturo gives solo jazz performances, performs with various jazz and classical groups (lastly with Giora Feidman), and has given concerts all over Europe and the USA. He has received several privately and publicly funded prizes, most recently the Werkjahrpreis of Kanton Solothurn/CH and lives as a free-lance musician in Hamburg.

**Georg Hajdu**  
**Compoer**

Georg Hajdu, born in Göttingen, Germany in 1960, is among the first composers of his generation dedicated to the combination of music, science and computer technology. After studies in Cologne and at the Center for New Music and Audio Technologies (CNMAT), he received his Ph.D. from UC Berkeley. In 1996, following residencies at IRCAM and the

ZKM, Karlsruhe, he co-founded the ensemble WireWorks with his wife Jennifer Hymer a group specializing in the performance of electro-acoustic music. In 1999, he produced his full-length opera Der Sprung. In May 2002, his Internet performance environment Quintet.net was employed in a Munich Biennale opera performance. In addition to his compositions, which are characterized by a pluralistic attitude and have earned him several international prizes, the IBM-prize of the Ensemble Modern among them, Georg Hajdu published articles on several topics on the borderline of music and science. His areas of interest include multimedia, microtonality, algorithmic, interactive and networked composition. Currently, Georg Hajdu is professor of multimedia composition at the Hamburg School of Music and Theater.

**Peter Hannan**  
**Compoer**

Hannan has composed numerous works in both acoustic and electronic media.He has written more than 50 commissions over the past 20 years , including large scale works for the Vancouver Symphony, the Winnipeg Symphony, the CBC Orchestra and the Pacific Baroque Orchestra; works for the experimental large ensembles Icebreaker (London) , the Hardrubber Orchestra, and Toronto based Hemispheres. His recent piece for the Vancouver Symphony, side with entropy received a raucus reception at its premiere in March 2005.His most recent work, written for the Vancouver Cantata Singers is called Happiness Index and explores the need that drives people to understand and find happiness.

A very fruitful and inspiring collaboration of recent years has been with the director and playwright Peter Hinton. In recent years, Hannan and Hinton have created two new operas together . 120 Songs for the Marquis de Sade opened in Vancouver in March 2002, and The Diana Cantata appeared in February 2003, both works produced by Modern Baroque Opera . Hannan also wrote the music for Peter Hinton’s 2006 production of The Duchess of Malfi at the Stratford Festival of Canada. Hannan and Hinton are currently collaborating on a new music theatre work for the National Arts Centre.

He is currently active as a performer of live electronic music, particularly in his work with Toronto composer Henry Kucharzyk in the duo PHH!K. His recordings include PHH!K Songs with Henry Kucharzyk and Christine Duncan, Breakdown, his solo CD of new recorder music, and numerous Canadian and international radio recordings, including CBC Radio, BBC Radio, WDR Koln, Radio Bremen, Radio France, and NOS

Radio, Holland.

**Todd Harrop**  
**Composer/Percussionist**

Todd Harrop studied composition with Gary Kulesha and Peter Hatch at Wilfrid Laurier University, with Sam Dolin at the Royal Conservatory of Music, and with John Celona at the University of Victoria.

Between studies he taught music history at Lester B. Pearson College of the Pacific and percussion at Lakehead University, and he has produced several new music concerts, either independently (Victoria) or with NUMUS Inc. (Waterloo). He has participated in workshops by Arraymusic, Domaine Forget, the Composers’ Orchestra, Casalmaggiore, Nouvel Ensemble Moderne, and readings by Bev Johnston, Joe Macerollo and Alain Trudel.

His works have been broadcast on the CBC and performed by various artists such as the Canadian Chamber Ensemble, the University of Western Ontario Percussion Ensemble, Jessica Catron & Johnny Chang, tranSpectra and the Penderecki String Quartet, in Canada, the U.S., Germany, Italy and New Zealand, and he has collaborated with choreographers Denise Lieutaghi, Annette Urbschat and Yvonne Ng.

Features of his style include monochromaticism, polymodality, stylistic quotation, irony, microtonality, sound poetry, complex rhythms, odd metres, slow tempi, aleatory and contrapuntal textures.

Mr. Harrop is also active as a percussionist and actor. He has performed for the Thunder Bay Symphony Orchestra, New Music in New Places, the Open Ears Festival, the Montreal Fringe Festival, Dancetheatre David Earle, Theatre & Company and The Grand Theatre.

**Ian Battenfield Headley**  
**Composer**

Ian Battenfield Headley, 20, was born and raised in Lower Manhattan. His first interest in music began in 8th grade, when he started guitar- but an appreciation for electroacoustic composition started in high school when he began experimenting with processing and sequencing guitar, vocals and other sounds in various ways. He is a junior at Northeastern University pursuing a BS in Music technology, where he has begun to compose pieces that explore extreme ranges of dynamics and micropolyphony.



### Ákos Hoffmann Clarinetist

Ákos Hoffmann was born in Hamburg in 1973. From 1994 on he studied with prof. Sabine Meyer and prof. Reiner Wehle at Musikhochschule Lübeck. After having taken his diploma, he studied for prof. Thomas Franke at Hochschule für Musik und Theater Hamburg. In 2006, he passed his soloist diploma with distinction.

He is a regular guest with several symphony orchestras, such as Münchner Kammerorchester and Philharmonisches Orchester der Landeshauptstadt Kiel. Furthermore, he was invited to work with Bläserensemble Sabine Meyer. Many concerts as a soloist as well as a chamber musician led him to many European countries and even to China and Puerto Rico.

In 2001, he founded Salon del Mar and appears not only as a musician, but also as the ensemble’s arranger.

His clarinet formation Trio DeVienne was granted benefits by Kunststiftung HSH Nordbank under the auspices of Sabine Meyer from2004 to 2006.

Ákos Hoffmann regularly performs in education concerts at Hamburgische Staatsoper.

He joined the Bohlen-Pierce clarinet project in 2009.

### Jacob Joaquin Composer

Jacob Joaquin started tinkering with music on a Commodore 64 while in elementary school. From 1994 - 1996 he ran the Digital Dissonance BBS, an online Fresno community where musicians traded orginal tracker-based electronic compositions. He received his BA in Music Synthesis from Berklee College of Music in 1999. During his time at Berklee he recieved his first C programming lesson from Max Mathews and was the first recipient of Berklee’s Max Mathews’ award. Jacob completed his Masters Degree in Composition New Media and Integrated Media at California Institute of the Arts in 2002. He has studied composition with Dr. Richard Boulanger, Mark Trayle and Morton Subotnick. Jacob actively blogs about computer instrument design at The Csound Blog. He currently resides in Fresno, California.

### Junku Kim Composer

Jinku Kim is a musician based in Boston MA, whose work focuses at the crossover between art and science. His work has recently stumbled upon Micro-tonal composition and audio-visual realtime performances. He has been seeking a way to

break the barrier between composition and performance with a motivation purely based on inventing ways to enjoy music whether conventional or unconventional. www.csounder.com

### Tilly Kooyman Clarinetist

Tilly Kooyman, clarinet, is an active solo, chamber and orchestral musician with a special interest in contemporary music. She has performed across Canada, toured Japan with the Higashi-Hiroshima Clarinet Ensemble, and performed at the World Bass Clarinet Convention in the Netherlands with the duo Bass Impact. This past summer, Tilly and poet/actor Rae Crossman were invited to perform at the International Clarinet Association’s ClarinetFest in Vancouver. Tilly can be heard on four compact discs of music by Canadian composers and has premiered many new works that have been broadcast on CBC’s Two New Hours and on West German Radio. She has worked with renowned Canadian composer R. Murray Schafer for over twenty years and has performed in many of his unique multi-disciplinary works of the Patria Cycle. Her education includes a Master of Music degree from the University of Western Ontario, an Associateship from the Royal Conservatory of Music and advanced studies at the Banff Centre School of Fine Arts. A former student of James Campbell and Robert Riseling, she has also studied ‘Deep Listening’ with Pauline Oliveros and free improvisation with Casey Sokol.

### Johannes Kretz Composer

Born 1968 in Vienna, studies (composition, pedagogy) at the music academy Vienna with F.BURT and M.JARRELL and mathematics at the University Vienna • 1992/93: studies at IRCAM, Paris with Marco Stroppa and Brian Ferneyhough • co-founder of the NewTonEnsemble, of the international composers group PRISMA and of www.ikultur.com • teacher for music theory and composition at the conservatory of Vienna • 1996-2001: teacher for for computer music at the academy in Vienna, since 2001 also music theory, since 2004 also composition, since 2009: habilitation in composition, associate professor (“Privatdozent”) • Since 2008: Head of the ZiMT (“center for innovative music technology”) of the music university Vienna • performances in Austria, Germany, France, Poland, Hungary, Turkey, Lithuania, Czechia, Argentina, Mexico, Kanada, China, Taiwan and South Korea • regular broadcasts in Austrian and German radio • commissions of works from Konzerthaus Wien, Klangforum Wien, Ensemble On Line, Vienna Flautists, quartett22, Internationale Lemgoer

Orgeltage, Haller Bachtage, Triton Trombone Quartett, Wiener Kammerchor • numerous grants and prizes

### Sascha Lino Lemke Composer

Sascha Lino Lemke studied composition, electronic music and music theory in Hamburg, Lüneburg and Paris. He has been awarded several prizes such as the Kranichsteiner Prize in Darmstadt. His works have been performed by any soloists and ensembles all around the world.

### David Lieberman Instrument Builder

Educated in architecture, sculpture, and industrial design at Cornell University in New York, California Institute of the Arts, California Institute of Technology, and the Architectural Association in London, England, David Lieberman has been a practicing architect since 1974. He is an Associate Professor at the John H. Daniels Faculty of Architecture Landscape and Design, University of Toronto and has a long term adjunct appointment at the School of Architecture, University of Waterloo. He has taught at the Laban Institute of Dance and in both Planning and Landscape Design in the Faculty of Environmental Studies at York University. Teaching responsibilities include thesis, urban design, comprehensive building studios, and lecture seminars in the culture of architecture. Recent work includes a cultural college for the Hobbema Cree Nation, production design for feature films and the stage, design of a 200 metre operable floating bridge, a house on the Toronto Islands, a medical clinic, a 25,000 sq.ft. roof garden, and a 150 unit residential condominium. Current work includes technical consultancy to a millwork fabricator, industrial design for a steel fabricator, several residences in the Toronto area, a fourplex in Manhattan, and a new daycare facility. Current research includes faculty advisor to North House, the University of Waterloo entry to the Solar Decathlon and advisor to the Gemini initiative in the Faculty of Engineering and Applied Science at the University of Toronto. As a member of the planning committee for the soundaXis festival of New Music and a board member of the Music Gallery, research has, of late, focused on listening to the sounds and desires of the city leading to the construction of a series of large scale instruments. David Lieberman is not a musician, but has enjoyed the pleasures of music and is constantly challenged by the space between notes.

### Psyche Loui Researcher

Psyche Loui is a neuroscientist studying music and the brain. She received her B.S. in Psychology and Music from Duke University and her Ph.D. in Psychology from the University of California at Berkeley, where she specialized in music perception and cognition. Her research was conducted jointly at Berkeley’s Center for New Music and Audio Technologies, Auditory Perception Laboratory, and the Helen Wills Neuroscience Institute, where her thesis used the Bohlen-Pierce scale to investigate the human ability to musical structure.

Dr. Loui is currently an Instructor in Neurology at the Harvard Medical School. Her current research, conducted in the Music and Neuroimaging Laboratory at the Beth Israel Deaconess Medical Center, mainly addresses the neural substrates of musical emotion and tone-deafness. Using behavioral and neuroimaging techniques, her research aims to identify how the human brain is able to perceive, produce, and appreciate music.

### Tim Lukens Composer

Tim Lukens is a composer, sound designer, and audio programmer. He currently attends Berklee College of Music in the Electronic Production and Design major. For live performance, Tim enjoys creating complex systems using different environments including Max/MSP, Csound, and his own C programs. Since arriving at Berklee, Tim has focused on electronic composition and audio programming. He recently wrote a chapter entitled “The MIDI Spec and Programming with PortMIDI” for Dr. Richard Boulanger’s book The Audio Programming Book to be published by MIT press in 2010. He is also the Electronic Production and Design department 2010 Max Mathews award recipient. Tim continues to program and compose as often as he can.

### John Mallia Composer

(b. 1968) I live and work in Boston, MA, U.S.A., and am fortunate to have a teaching position on the Composition Faculty at the New England Conservatory of Music where I work with many talented students and direct the Electronic Music Studio. My compositional process is informed by spatial models and concepts, and I enjoy collaborating with visual artists on multimedia works including installation. Recent projects include collaborations with new media artist Denise Marika on a score for her performance video installation Leg, and with animator/bookmaker Misa Saburi on her work entitled The Boy In the Windy Town.



My music has been performed internationally by organizations such as Musicacoustica (Beijing, China), Ensemble N\_JP (Japan/US), L.A. Freewaves (California), Gaudeamus (The Netherlands), International Computer Music Association, Society for Electro-Acoustic Music in the United States, Zeppelin Festival of Sound Art (Barcelona, Spain), Festival Synthèse (Bourges, France), Interensemble, Computer Arts Festival (Padova, Italy), New York City Electroacoustic Music Festival, Boston CyberArts, and Medi@terra`s Travelling Mikromuseum (Greece, Bulgaria, Germany, Yugoslavia, Slovenia).

I was a Visiting Assistant Professor at the Center for Experimental Music and Intermedia (CEMI) at the University of North Texas (2004-5), and have also taught electroacoustic music and sound art at Franklin Pierce College, Northeastern University, the School of the Museum of Fine Arts, Boston, College of the Holy Cross, Clark University and Brandeis University.

### Max Mathews Composer

I was born in Nebraska in 1926. After serving in World War II as a radar technician in the navy, I studied electrical engineering at Cal Tech and MIT where I received a Sc.D degree in 1954. I worked in the Bell Telephone Laboratories from 1955 to 1987 and at Stanford University music department (CCRMA) from 1987 to 2005. I currently live in San Francisco and continue to do research at CCRMA. I studied violin performance until I finished high school and continue to enjoy playing as an amateur.

My job interests focused on applications of computers, at MIT analogue computers to intercept and destroy attacking missiles, and at Bell Labs digital computers to design speech coders.

In 1957, with the encouragement of my boss, John R Pierce, I started writing the programs Music 1 through Music 5 to synthesize music on a digital computer. These are open source programs. Music 5 (1967) was written in the compiler Fortran. Music 5 together with my book, The Technology of Computer Music, the MIT press 1969 made computer music synthesis widely accessible. In 1968, F.R. Moore and I built “Groove” one of the first real-time performance synthesizers which involved a digital computer.

From 1987 to much of my time was spent making new con-

trollers for real-time synthesis. My efforts together with Tom Oberheim and Bob Boie culminated in the Radio-Baton which tracks two batons in as they move in three dimensional space thus allowing one performer to control a music performance with six independent variables. In the last years I have been experimenting with “phaser filters” to synthesize more beautiful timbers. These filters add high Q resonances to music. The frequencies and Q’s of these resonances can be dynamically changed during a performance.

### Seiya Matsumiya Composer

Seiya Matsumiya is a Japanese-born composer/sound designer/audiovisual artist currently residing in Somerville, MA. A classically trained musician, he began playing the piano at an early age. When he was young his family moved to southern California, where he dove deep into the world of rock music as a teenager and played guitar in several bands, producing a few records. He enrolled in the Berklee College of Music in the spring of 2007, dual-majoring in Music Synthesis and Contemporary Writing & Production. He has since become heavily involved in electronic music production, using computer programs such as Logic Pro, and Pro Tools, and also designing his own using Max/MSP/Jitter, and Csound. He is the 2010 recipient of The Roland Award from The Music Technology Division of The Berklee College of Music. He is currently in the prospect of graduating, after which he plans to enroll in a graduate school to further pursue the study of electronic music.

### Katarina Miljkovic Electronic Composer

Composer Katarina Miljkovic investigates interaction between science, music and nature through collaborative musical performance. This interest led her to the mathematician Benoit Mandelbrot’s essay The Fractal Geometry of Nature and self-similar complex structures resulting in the cycle, Forest, “...a dreamy piece, along the lines of Feldman or Brown...entirely captivating” (Signal to Noise).In collaboration with Wolfram Research, Miljkovic has been working on sound mapping of the elementary rules from Stephen Wolfram’s New Kind of Science. She presented her exploration in this new field at Brown University, NKS conferences in 2004, Waltham, MA, Wolfram Technology Conference 2005, Champaign, Illinois, NKS 2006, Washington, D.C., NKS 2007, University of Vermont, The Musical and Scientific Legacies of Iannis Xenakis, 2006, Toronto and, the International Conference on Math-

ematics and Computation in Music, MCM 2007, Berlin. Her generative music has been described as “a refined, hypnotic dream” (Danas) “a work of musical and visual slow-motion with only a few delicately elaborated musical metaphors” (Radio Belgrade). Her recent collaborative projects include works with Theater Dah, Belgrade, director Vlada Petric, Harvard University, choreographers Dawn Kramer and Stephen Buck, composer Gene Coleman and sho performer Ko Ishikawa, Japan. Miljkovic has been a faculty member at the New England Conservatory of Music, since 1997.

### Stratis Minakakis Composer

Composer Efstratios (Stratis) Minakakis studied composition, theory and piano performance in his native Greece, the United States. and France. His output includes work for solo, chamber and orchestral ensembles, as well as music for theater. His compositional idiom has been described as “at once highly complex and strikingly organic” with “an impeccable sense of dramatic intensity.” Also active in the field of music theory, his current research interests include avant-garde movements of the European periphery and issues of form and content in post-1945 music.

A recipient of numerous artistic and academic honours, his recent awards include a bronze medal in the 2nd International Composition Competition of the Centre for Mediterranean Music, the Toru Takemitsu Award of the US-Japan Society of Boston, the PRISM Quartet Young Composer Commissioning Award, and the University of Pennsylvania’s award in composition, which he received in four consecutive years. His academic and pedagogical work at the University of Pennsylvania earned him the Dean’s Scholar Award 2006-2007, the Award in Teaching by Graduate Students, and the Dean’s Award for Distinguished Teaching.

Stratis Minakakis’ music has been performed and commissioned by leading institutions and ensembles, such as the Arditti String Quartet, the PRISM saxophone quartet, Ensemble Counter)induction, the Second Instrumental Unit, Chamber Music Now, and Princeton University.

He has been invited to lecture in Europe, and the United States, on the music of Milton Babbitt and the Greek avant-garde.

### Mike Moser-Booth Composer

Mike Moser-Booth is a computer musician and guitarist born in Nashville, TN. He began his music career playing heavy metal, but an introduction to the avant garde composers of the twentieth century lead him to the realization of the vast possibilities of experimental composition and performance, and of sound itself. He now holds a B.M. in Music Synthesis from Berklee College of Music, where he developed an application that synthesizes sound through the manipulation of digital images. He has published music written for classical guitar, and his current work involves developing interactive performance systems using alternative controllers and live instruments. [www.moser-booth.com](http://www.moser-booth.com)

### Nora-Louise Müller Clarinetist

Nora-Louise Müller was born in Hannover in 1977 and started her studies in 1996 at Hochschule für Musik und Theater Hannover with prof. Karl-Heinz Steffens and prof. Johannes Peitz. After her degree as a clarinet teacher, she proceeded with prof. Reiner Wehle and prof. Sabine Meyer at Musik-hochschule Lübeck and achieved her artistic diploma in 2005. Furthermore, she took important inspirations from courses at Scuola Internazionale di Perfezionamento Musicale in Piacenza, Italy with prof. Hans Deinzer throughout several years.

In 2004, she was a scholarship holder of International Ensemble Modern Academy in Schwaz, Austria. In 2005, she was a participant of Ensemble Academy Freiburg with Freiburger Barockorchester and ensemble recherche. Her intense occupation with contemporary music led to collaboration with numerous composers, e.g. Rebecca Saunders, György Kurtág, Vytautas Miskinis and Hans Zender. She premiered a number of works written for her.

Keen to experiments and inspired by her spirit of research, she founded Ensemble Klangunion in 2007. In 2008, the ensemble appeared in an exposed function in the project Composer in Residence at the contemporary music festival chiffren - Kieler Tage für Neue Musik. She regularly performs with Ensemble 21, Hamburg. She joined the Bohlen-Pierce clarinet project in 2007, when she got to know Prof. Georg Hajdu.

### Jascha Narveson Composer

Jascha Narveson’s music is rooted in rhythm and timing, and draws from everything it can. He absorbed the language of the classical music cannon from an early age, being surround-

ed by live chamber music recitals in his family home in Waterloo, Ontario, and later went on to play in industrial bands, improvised noise-music ensembles, study North Indian tabla, computer programming, South Indian rhythm, Batá drumming, Georgian choral music, and many other things besides. His disparate influences seem, over time, to be less and less disparate to him.

**Yvonne Ng**  
**Dancer**

Yvonne Ng’s intensity, grace and mesmerizing presence have made her an unstoppable force on the Canadian and international dance scene. Ng is a dancer, producer, choreographer, teacher and artistic director of her company, tiger princess dance projects. The company’s repertoire includes fourteen works choreographed by Ng and eleven works by some of Canada’s most renowned choreographers. Ng was honoured with a Dora Mavor Moore Award in 2000 and has been nominated eight times. Ng has received the prestigious K.M. Hunter Dance Award, the New Pioneers Arts Award and Chalmers Arts Fellowship. In 2007, Ng was awarded the Premier’s Emerging Artist Arts Award along with Canadian dance legend Peggy Baker. Since 2006, she teaches in the Theatre Dept at Juniata College, Pennsylvania, U.S.A. and is a performer in their professional company, The Gravity Project. In addition to choreography and performance, Ng is the Artistic Director of Series 8:08 (since 1994) and the curator and presenter of dance: made in canada/fait au canada, both of which produce the work of choreographers from across Canada.

**Shane Neill**  
**Cellist**

Shane Neill is a cellist, baroque cellist, designer, and installation artist. An accomplished chamber musician, Shane has played in many festivals in the United States and Canada. Most recently, Shane was a founding member of GaltStudio whose installation, twofold garnered the People’s Choice Award for Toronto’s 2009 Nuit Blanche.

**Larry Polansky**  
**Composer**

Larry Polansky is a composer, theorist, performer, teacher, writer, editor and publisher. He is the Strauss Professor of Music at Dartmouth College, where he also teaches in the graduate program in electro-acoustic music. Prior to moving to New Hampshire, he worked at the Mills College Center for Contemporary Music Center as staff and faculty. He is one of the three co-authors (with Phil Burk and David Rosenboom)

of the widely used computer music language HMSL, and has written a great deal of other musical software. His music has been recorded, performed, reviewed and written about widely, and his articles and writings have appeared in numerous publications, on diverse topics including theory, computer music, and American music. He is the co-founder and co-director of Frog Peak Music (A Composers’ Collective), the founding editor of the Leonardo Music Journal, and works actively with other musical journal and institutions.

His solo CDs are on Artifact (The Theory of Impossible Melody, Simple Harmonic Motion, Change), Pogus, Cold Blue (Four Voice Canons), and New World Records (Lonesome Road). His book on Ruth Crawford (The Music of American Folk Song) is published by Rochester University Press. His current musical ensembles include Trio (with Kui Dong and Christian Wolff).

**Jose Dario Quiñones**  
**Composer**

Born in the city of Bucaramanga, Colombia, in 1982, where he obtained his degree in composition. Two years later, he moved to Germany with the purpose of studying and experiencing electronic music. In 2008, he got the opportunity to study in the European Live Electronic Centre (EULEC) in Lüneburg. One year later, he started a master’s program in Multimedia Music in the Hochschule fur Musik und Theater Hamburg.

For years he has been interested, even obsessed with electronics and noise. Besides, he enjoys working with empirical musicians and artists.

**Reinhard Reitzenstein**  
**Multimedia Artist**

Reinhard Reitzenstein works in visual media and in sound installation, exploring processes connecting the natural, the cultural, the and technological. His series of three multi-media installations — with music by Gayle Young — is presented on the 1981 LP “According,” and his performance within a site-specific long-string installation, Klang Bau, also a collaboration with Young, is documented on the Spool CD “Test Tubes.” Reitzenstein has been an instructor in sculpture and interdisciplinary studies at several universities and colleges, and since 2000 he has been the Director of the Sculpture Program at SUNY, Buffalo. Reitzenstein has completed several commissioned sculptural works, presented over one hundred solo exhibitions, and participated in over three hundred group

exhibitions in North America and abroad. His work is represented in over fifty public and corporate collections.

**Curtis Roads**  
**Researcher/ Computer Musician**

Curtis Roads creates, teaches, and pursues research in the interdisciplinary territory spanning music and technology. He studied computer music composition at California Institute of the Arts and the University of California, San Diego (UCSD) and received a Doctorat from the Université Paris 8.

He was Editor and Associate Editor of Computer Music Journal (The MIT Press) from 1978 to 2000, and cofounded the International Computer Music Association in 1979.

A researcher in computer music at MIT (1980-1986), he also worked in the computer industry for a decade. He taught electronic music composition at Harvard University and sound synthesis techniques at the University of Naples. He was appointed Director of Pedagogy at Les Ateliers UPIC (later CCMIX) and Lecturer in the Music Department of the University of Paris VIII. Among his books are the anthologies Foundations of Computer Music (1985, The MIT Press) and The Music Machine (1989, The MIT Press). His textbook The Computer Music Tutorial (1996, The MIT Press) is widely adopted as a standard classroom text and has been published in French (1999, second edition 2007), Japanese (2001), and Chinese (2008) editions. He edited the anthology Musical Signal Processing in 1997. His book, Microsound (2002, The MIT Press) presents the techniques and aesthetics of composition with sound particles.

Certain of his compositions feature granular and pulsar synthesis, methods he developed for generating sound from acoustical particles. He developed the Creatophone, a system for spatial projection of sound in concert. Another invention is the Creatovox, an expressive new instrument for virtuoso performance that is based on the synthesis of sound particles. The Creatovox, developed in collaboration with Alberto de Campo, was first demonstrated to the public in March 2000.

His composition Clang-tint (1994) was commissioned by the Japan Ministry of Culture (Bunka-cho) and the Kunitachi College of Music, Tokyo. His music is available on compact discs produced by the MIT Media Laboratory, Wergo, OR, Mode, and Asphodel.

A pioneer in the development of granular synthesis (1974),

he also developed (with Alberto de Campo) a sound particle synthesis program PulsarGenerator (2001), distributed by the Center for Research in Electronic Art Technology (CREATE) at UCSB. He is keenly interested in the integration of electronic music with visual and spatial media. His collection of electronic music compositions POINT LINE CLOUD won the Award of Distinction at the 2002 Ars Electronica in Linz and was released as a CD + DVD on the Asphodel label in 2005.

In 2008, CREATE released EmissionControl, a new program for sound granulation written by David Thall in consultation with Curtis Roads.

Since 2004, he has been researching a new method of sound analysis that is the analytical counterpart of granular synthesis called dictionary-based methods (DBMs). This research is sponsored by the National Science Foundation.

Roads's new book is Composing Electronic Music (forthcoming) Oxford University Press. A new revised edition of The Computer Music Tutorial by The MIT Press is also forthcoming.

**Marion Samuel-Stevens**  
**Singer**

Soprano Marion Samuel-Stevens is a graduate of the University of Toronto’s Voice Performance and is an avid supporter of new music and new performance practices. Marion was one of 8 semi-finalists in the 2008 Eckhardt-Grammatté competition and has worked with Richard Armstrong and Jaqueline Vaillancourt as well as the Queen of Puddings Music Theatre. Marion has performed Grigori Frid’s Diary of Anne Frank as Anne, Peter Skoggard’s new opera Stratas in the title role, Ruth in Ronald Beckett’s opera Ruth, Mark Adamo’s Little Women as Beth, as well as David Del-Tredici’s Alice with the National Ballet of Canada Orchestra. Operatic roles include Elle in La Voix Humaine by Poulenc, Hélène in Hindemith’s Hin und Zurück and Estelle in The Stronger by Hugo Weisgall, Queen of the Night in The Magic Flute by Mozart and Titania in Britten’s A Midsummer Night’s Dream. Oratorio highlights include Mozart’s Coronation Mass and Vespers, Haydn’s Paukenmesse, Lord Nelson Mass, and Creation. Vivaldi’s Gloria and Magnificat, Gounod’s St. CeciliaMass, Faure’s Requiem, Handel’s Messiah and Vaughan Williams’ Sea Symphony, Pergolesi’s Stabat Mater and the Christmas Oratorio by J. S Bach, Brahms Requiem, and Mozart’s Mass in C minor. Marion brings her love of movement and a great imagination to all projects that she is involved with!



### Rick Sacks

#### Percussionist

Rick Sacks received his Masters in Music at the State University of New York at Stony Brook (1976). During his stay at Stony Brook, Rick began freelancing in Manhattan performing with ensembles including The New Orchestra, Newband, The New Jersey Percussion Ensemble and The Composer’s Ensemble under such directors as Arthur Weisberg and Charles Wuorinen. After teaching for two years at Bennington College in Vermont (1979/80), Rick began traveling to Toronto to perform in the art-rock band KLO. The band’s success led to an LP record and Permanent Resident status in 1982. Once settled in Toronto, Rick founded the PhenomeNONsemble which he used as a platform for his unique performance works mixing contemporary music practices with theatre techniques.

Mr. Sacks also composes and creates sound designs for theatre and film. His work in children’s theatre has resulted in continuous performances throughout Europe and the US. In 1986 Mr. Sacks revised and Edited, for COLFRANC Music Publishing Corp., Edgard Varèse’s Hyperprism available through Boosey and Hawkes.

Rick performs with the Canadian Opera Company, on film tracks, in modern dance works and with the contemporary and avant-garde groups Arraymusic, The Glass Orchestra, New Music Concerts, Ensemble Noir, Red Sky, Tapestry New Opera, The Evergreen Club Gamelan, Queen of Puddings and many others. He has toured extensively throughout Africa, Asia and Europe with these groups and has worked with such masters as Pierre Boulez, Henry Brant, George Crumb, Heinz Holliger, Mauricio Kagel, Udo Kasemets, Helmut Lachenmann, Witold Lutoslawski, Terry Riley and James Tenney.

### Dan Sedgwick

#### Percussionist

Dan Sedgwick recently graduated with his doctorate in composition from Rice University, where he studied with Kurt Stallmann, Anthony Brandt, Karim Al-Zand, and Shih-Hui Chen. Dan’s recent works include instrumental chamber music, rounds and other vocal music, music with spoken text (both chamber and orchestral), and electronic music, including work with recorded and synthesized sound, as well as animation. His works have been performed by the Auros Group for New Music, the Apple Hill Chamber Players, faculty of the Apple Hill Summer Chamber Music Festival, the Keene

Chamber Orchestra, the Houston Boychoir and the Eupraxia Arts Collective. As a pianist, Dan has spent the past twelve summers at the Apple Hill Center for Chamber Music studying, performing, and coaching chamber music in a variety of capacities (as a student participant, guest artist, and faculty member). In the past two years, Dan has been expanding his performing experiences to include singing, puppeting, and playing a variety of instruments with composer/performers Marji Gere, Jacob Barton, and others as the performance group “An Exciting Event,” as well as performing electronic disco/pop on synthesizers and vocoder with the Kelley Polar live band. Dan currently works as a teaching assistant at Harvard University’s Music Department. In addition, he collaborates with Marji Gere to create and perform weekly music and puppetry events at the Charlestown Working Theater in Charlestown, Massachusetts.

### Adam Shechter

#### Composer

Adam Shechter is a last semester Electronic Production and Design student at Berklee College of Music. Adam’s interest in music began at an early age while taking piano lessons, switching to guitar in his early teens. While playing in rock bands, he got exposed to Kraftwerk and electronic music, a passion that grew with time. After completing an audio engineering program in Washington DC, enrolling at Berklee College of music was a natural step for him in his musical journey.

### Manfred Stahnke

#### Composer/ Theoretician

Manfred Stahnke, born October 1951 in Kiel, Germany, studied composition with Wolfgang Fortner 1970-73, Klaus Huber and Brian Ferneyhough 1973-74, György Ligeti 1974-79. Besides he studied piano with Edith Picht-Axenfeld, and violin. After his studies in composition he finished his dissertation in musicology on Pierre Boulez’ Third Piano Sonata (1979, under Constantin Floros in Hamburg. 1979-80 he went to the USA to study with the microtonalist Ben Johnston in Urbana, Illinois, and with the computermusic scientist and composer John Chowning in Stanford, California. In 2001, Stahnke wrote ORPHEUS KRISTALL, opera in two media (stage and internet), for Muenchener Biennale, premiered 3 May 2002 (for details see German page), and before that two microtonal operas, premiered in 1981 (USHER after E.A.Poe, published by Ricordi ) and 1987 (HEINRICH IV, after Pirandello). He wrote several orchestra pieces, like DER MANDELBROTBAUM, played by the Sinfonieorchester des Südwestfunks Baden-

Baden 1992, TRACE DES SORCIERS, Festival Donaueschinger Musiktage 1997, and DANZBODNLOCK - Violin Symphony, Festival Donaueschinger Musiktage 2006. There is a long list of chamber music, played by outstanding ensembles like the Stockholm Woodwind Quintet, ensemble 13 Baden-Baden, ensemble avance Stuttgart, Clementi-Trio Köln, ensemble modern Frankfurt, Nieuw Ensemble Amsterdam, Accanto Trio Stuttgart, ensemble chaosma Hamburg, Wolpe Trio Köln, ensemble Est!Est!!Est!!! Saarbrücken, ensemble Intégrales Hamburg, ensemble wireworks Hamburg etc. Most of the musical works are privately published and available under the private address. There are many publications of his, e.g. about general aesthetics, or Harry Partch, György Ligeti, Pierre Boulez, Gérard Grisey, also on his own work. Since some of the writings are difficult to find, they are privately published and available under the private address. He is professor for composition and music theory at the Hamburg Musikhochschule. Recently (2007) he worked together with le nouvel ensemble modern in Montréal and gave lectures and a masterclass at McGill University and Université de Montréal.

### Ron Sword

#### Composer

Ron Sword is an experimental intonation guitarist and author, who builds his own instruments and as a luthier owns a guitar company specializing in microtonal and just intonation guitars. Sword plays just intonation, and microtonal equal pitch-space division guitars as well.

Sword currently resides in Florida, and makes his living as a private guitar instructor and head luthier of Sword guitars. He currently has over 40 private students (about 1/2 microtonal), and teaches BP guitar, as well as the equal tunings 15, 16, 20, 21, 24, 31, 41 and others, from his own scale and theory books he has produced to explore the harmonic resources in both Just and Equal systems.

### Elaine Walker

#### Singer/Researcher

Elaine Walker is the founder and visionary of the all-electronic microtonal space-pop band, ZIA. Since 1991, her philosophy for ZIA has been to show a positive view of the future, to embrace technology as an inevitable part of our future, while breaking down unnecessary artistic walls. The biggest artistic “wall” in her eyes is the 12 tone tuning. Elaine got her degree in Music Synthesis at Berklee College, where Dr. Boulanger introduced her to the Bohlen-Pierce Scale. She received her masters in Music Technology at NYU, studying under Dr.

Rowe. Elaine now teaches Electronic Music at Scottsdale Community College in Arizona and spends her time developing microtonal-friendly MIDI controllers and composing in her favorite equal temperaments.

### Arash Waters

#### Composer

Arash Waters, a current graduate student at New England Conservatory of Music was born in Esfahan, Iran. He holds a dual-major “Summa Cum Laude” bachelors degree in composition and music synthesis from Berklee College of Music. Arash has been a private student of composer Vuk Kulenovic, and is currently studying classical composition with John Mallia at the conservatory. He is the winner of many awards including the 2008 Youth Concerts at Symphony Hall Award.

### Julia Werntz

#### Composer

Julia Werntz studied composition independently with composer and saxophonist Joseph Maneri for several years, and earned her doctorate from Brandeis University. Since the mid 1990s, her music has been almost exclusively microtonal. Her compositions have been performed at concert series and festivals around the Northeastern United States and Europe, including the Tage für Neue Musik 2003 at the Darmstadt Akademie für Tonkunst, the Stockholm New Music Festival, the 16th Week of Contemporary Music, Bucharest, the Here/Now Festival in Sofia, Bulgaria, the UK Microfest3, the BKA Theater in Berlin, New York’s Vision Festival, and June in Buffalo. In Boston, her works have been performed by the Enchanted Circle, Extension Works, Auros Group for New Music, Firebird Ensemble, Prana Duo, and Boston Microtonal Society concert series.

Werntz has published articles on microtonal and other contemporary music in Perspectives of New Music, The Sonneck Society Bulletin, ParisTransatlantic, and NewMusicBox. At the New England Conservatory, she teaches Microtonal Composition and Performance as well as tonal music theory, and she teaches composition at Northeastern University. She is Artistic Director of the Boston Microtonal Society, and co-founder of its chamber ensemble, NotaRiotous.

### David Wessel

#### Researcher/ Computer Musician

David Wessel received a BS in Mathematical Statistics from the University of Illinois and then a PhD in Mathematical and Theoretical Psychology from Stanford in 1972. From his high



school years onwards his musical activities were central to his life and after his PhD he committed himself to blending his science and technology skills with his musical interests. In the early 70’s at Michigan State University as an Assistant Professor his experiments with perceptually-based dimensionality reduction techniques provided expressively powerful control of high-dimensional sinusoidal-track sound synthesis algorithms. In 1976, at the invitation of Pierre Boulez, the French composer and conductor, he moved to Paris to work as a researcher at the then nascent Institut de Recherche et Coordination Acoustic/Musique IRCAM. In 1979 he was made head of IRCAM’s Pedagogy Unit and linked the science and technology side of the institute and the artistic side. In the mid-eighties he started a new unit in IRCAM dedicated to developing real-time music software for personal computers. At the time Wessel taught the first computer music class at the Paris Conservatory. For his work at IRCAM he was recognized as Chevalier dans l’Ordre des Arts et des Lettres by the French Minister of Culture.

In 1988, he arrived at UC Berkeley as Professor of Music with the charge of building the interdisciplinary Center for New Music and Audio Technologies (CNMAT). He organized CNMAT as a laboratory wherein both science and technology people interact on daily basis with musicians. Wessel insists on an instrumental conception – the computer as musical instrument equipped with gesture sensing devices and sound diffusion systems.

**Steven Yi**  
**Composer**

Steven Yi is a composer and programmer living in Rochester, NY. He is the author of the blue music composition environment, a developer of Csound, and co-editor of the Csound Journal.

**Edward Young**  
**Composer**

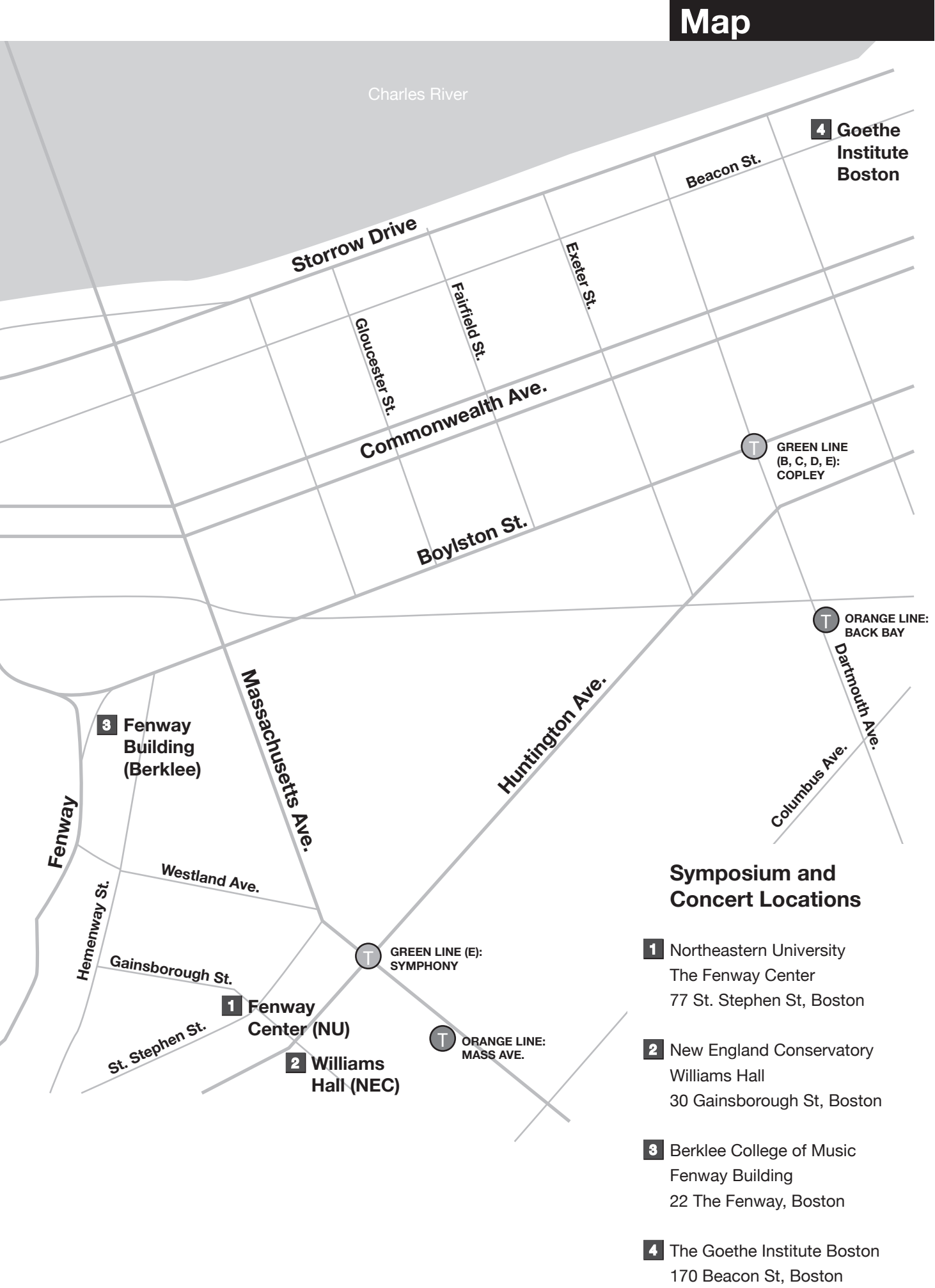
Edward Young is a fourth year Music Technology student at Northeastern University. His compositional styles encompass the worlds of acousmatic music, classical, and a wide array of others. He is currently studying Network Improvisation with Georg Hajdu at Northeastern, where he has been working and continues to explore the possibilities of computer-to-computer live performance. Edward plans to continue his study of, and composition in, the contemporary musical realms after his departure from Northeastern.

**Gayle Young**  
**Composer**

Gayle Young began in the late 1970s to present concerts as a composer/performer, playing microtonal music on two acoustic instruments of her own design. She writes for both orchestral and electronic instruments, and has also been involved in soundscape for many years, using pre-recorded and audio in her work. She has written many articles on her own work and that of other artists, addressing issues related to contemporary sound arts. Young wrote the biography of Hugh Le Caine (1914-1977), an early inventor of electronic music instruments, and is the publisher of Musicworks Magazine. She has collaborated with visual artist Reinhard Retizenstein on several sound installations.

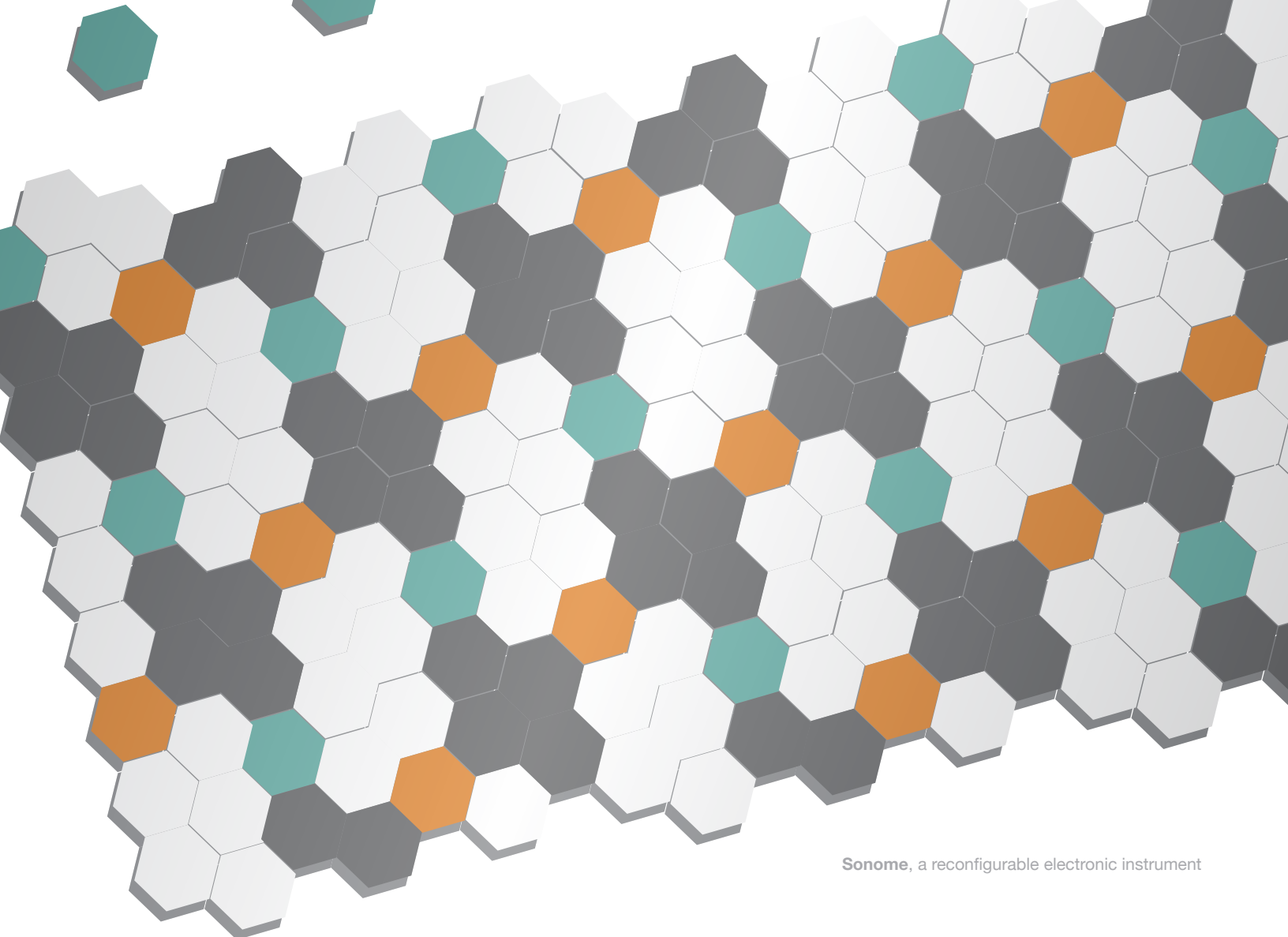
**Zachary Zukowski**  
**Composer**

Zachary Zukowski is a guitarist, percussionist, and electronic musician from Cleveland, Ohio. He currently studies music technology at Northeastern University and is interested in exploring interactive composition techniques for new media art.



**Symposium and  
Concert Locations**

- 1** Northeastern University  
The Fenway Center  
77 St. Stephen St, Boston
- 2** New England Conservatory  
Williams Hall  
30 Gainsborough St, Boston
- 3** Berklee College of Music  
Fenway Building  
22 The Fenway, Boston
- 4** The Goethe Institute Boston  
170 Beacon St, Boston



Sonome, a reconfigurable electronic instrument

**The Bohlen-Pierce scale** was discovered independently by Heinz Bohlen, Kees van Prooijen and John Pierce in the 1970s and 80s and has some "lucky" properties making this scale increasingly interesting to composers, theorists, mathematicians, cognitive psychologists and instrument makers alike. Recently, a **Bohlen-Pierce clarinet** was constructed by Canadian clarinet maker Stephen Fox; other acoustic Bohlen-Pierce instruments include **recorder, guitar, pan flute, metallophone** and a non-standard string instrument called the **Stredici**.

**Lecture & Presentation** participants include Richard Boulanger, Curtis Roads, Manfred Stahnke, Larry Polansky, David Wessel, Clarence Barlow, Johannes Kretz, Elaine Walker, David Lieberman, Georg Hajdu, and many more. **Keynotes by Heinz Bohlen and Max Mathews.**

<http://bohlen-pierce-conference.org>



Northeastern University *Department of Music*



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