# geometria situs 

(2009-10)
James Saunders
geometria situs was commissioned by Südwestrundfunk for the Donaueschinger Musiktage 2010

First performed by Sylvain Cambreling and the SWR Sinfonieorchester BadenBaden, Donauescingen, 17 October 2010.

## programme note

Geometria situs is the Latin term adopted for the study of the geometry of place, a field of mathematics which has become known as topology. Topology deals with the spatial properties of an object which remain constant when undergoing deformations such as compression or stretching, but not by cutting or gluing. Some objects may be deformed into each other; the classic example is a coffee cup and a donut, both of which feature a single hole. Topology is also referred to as flat sheet geometry.

In geometria situs, all players operate independently and have a series of pages, each of which features a sustained sound which undergoes a series of gradual changes of timbre and dynamic. Each change is cued by the conductor who marks them at irregularly spaced time points.
The material is therefore stretched and compressed depending on its placement in the piece, such that the same material might be differently structured on each hearing.
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## instrumentation

Instrumentation is flexible, but could comprise:
3 (3 d.pic), 3. (2 d.cor), 3 (3. d. bcl).3/4.3.3.2/timp.3perc/14.12.10.8.6
percussion required: bass drum, tam tam, vibraphone, crotales
All players will need at least on auxiliary instrument as determined by their selected pages. See below for information.
number of pages
\(\left.$$
\begin{array}{llll}\text { conductor } & 5 & \begin{array}{l}\text { percussion } \\
\text { timpani }\end{array}
$$ \& 24 <br>
starting cue \& 10 \& \& 8 <br>

flute \& \& \& blown tube\end{array}\right]\)| 6 |
| :--- |
| oboe |

Duration: up to 25 minutes.
geometria situs comprises a set of pages for orchestral players and time charts for the conductor. The conductor gives cues at each of the time points, which trigger actions and changes in sound by the players.

Pages should be distributed amongst the orchestral players. Where multiples of a single instrument are present (e.g. violas), split the pages evenly amongst them such that all pages are used before duplicates are included. Where there are insufficient pages to provide enough material, players may be given copies of pages already distributed, such that these are also spread evenly before further duplicates are used.

Each player should be provided with instrumental parts for their specific instrument. Each player should also be given at least one auxiliary part as follows:
woodwind blown tube; cup on surface
brass
blown tube; cup on surface
percussion bowed polystyrene; bowed wood; bowed plastic cup; cup on surface
strings bowed polystyrene; bowed wood; bowed plastic cup
Players should source auxiliary instruments themselves, such that a variety of objects are used in a performance. Where possible, avoid duplicating objects used by other players.

Each player is also given a page which indicates their starting point. These pages should be spread evenly amongst players, such that there is an equal spread of each starting timepoint, and that these are also shared evenly amongst the different instrument types.

The conductor selects one of the time charts. For shorter performances, later time points may be omitted. The conductor needs a stopwatch.

The conductor gives cues at each of the time points on the selected timechart. These should be given with a clear downbeat. In between each downbeat, the approximate time to the next timepoint should be indicated so that players can measure the transition of their sounds. This might be achieved by gradually raising the other hand proportionally over the required duration so that it reaches the top of the downbeat at the correct time.

The players all act individually. Their selected pages should be ordered in advance of the performance without reference to choices made by other players. The ordering should be changed for each performance (and rehearsal as appropriate).

Each page of the instrumental parts comprises a single held sound separated into distinct phases by vertical cue points. Each sound changes one parameter (e.g. dynamic, timbre, playing technique) between or at a cue point. Where a sound changes between cue points, this should be an even and gradual transition. Where there is a sudden change (e.g. moving from normal to tremolo bowing), where possible the change should be gradually introduced in advance of or following the cue (e.g. so the tremolo might gradually accelerate to full speed by the cue). Transitions around cue points should in general be smooth.

Players individually select a cue given by the conductor at which to begin their next page. The first cue is provided by the page supplied in the part (i.e. +6 would mean to start on the sixth cue, and +1 would mean to start on the first cue etc.).

After completing their first page, players determine freely when they begin their next page. There must be at least one inactive period for each player between pages however (i.e. the final cue of the preceding page may not also be the first cue of the next). If all pages are used before the performance is complete, they may be reused.

The first of the selected conductor cues becomes cue 1 on the current page. Players complete the page as determined by the duration of the cues given by the conductor. The choice of starting point will therefore affect the duration of each page, and the changes within it.

When there are 10 cues remaining, the conductor will signal this by counting down on their fingers when giving cues. At this point, players may only begin a new page if there are sufficient cues remaining for it to be completed (i.e. if the conductor has signalled '4' remaining cues, pages with five or more cue points may not be started, and the player remains silent until the end).

In general, there should be a relatively uniform sound and balance between all instruments. The low dynamic range should be adjusted appropriately to allow for the correct sound production on the edge of silence at the low end, through to an audible result with enough presence for the performance space at the higher end.

For sounds which need to be interrupted through breaths or bow changes, try to create as smooth a result as possible, and avoid cue points for changes.
transposing instruments

## general instructions

o-pppp(-----)
$\operatorname{ppp}(<>)$

## wind and brass

[throat]
[air/pitch]
[air/noise]
[bleed]
mutes
flute
[whistle tones]
[blocked]
diamond noteheads
oboe/bassoon
[rolling tone]
tr

Parts may be played on any related instrument unless specified (e.g. flute parts can be played on piccolo, alto flute etc.). If a transposing instrument is used, the sounding result will vary depending on the transposition.

The sound should be on the edge of silence, and stop and start irregularly, or have an inconsistent quality due to any associated playing techniques (often used on combination with various tremolo or o-pppp markings).
The sound should centre on the indicated dynamic, but allow any micro-variations to emerge naturally (do not try to play them though)

A very rapid series of single articulations of the air stream in the throat (not a growl or flutter-tongue). The pace should be as fast as possible, to the point where it is hard to control the regularity of the attack.

Breath sound with a clear pitch component. Where this is unspecified (single-line stave), any pitch may be selected. Where two-line staves are used, a lower- and higher-pitched breath sound should be selected. Where trills are marked on breath sounds, find a fingering which allows the articulation to be heard clearly. Breath sound with little pitch component. Noise tones should be emphasised.

Multiphonic. All multiphonics should be relatively pure, with a tendency towards consonant pitch content. Where more than one multiphonic is indicated on a page, each should be different.
An alternate, timbre fingering (small mictrotonal detunings are acceptable). The numbers are based on Peter Veale's The Techniques of Oboe Playing (Kassel, 1998) and range from 0 (normal fingering) to 5. The higher the number, the more diffuse the result.
Slightly depress or raise a valve from the normal fingering to destabilise the sound. Where a trill line is also indicated, the position of the valve should be slowly varied.
Mutes are indicated as boxed text. See auxiliary instrument instructions for related markings

Conventional whistle tones. Aim for a relatively stable pitch, but accept any occasional oscillations.
Place mouth completely over mouthpiece and blow into instrument.
A hollow pitched tone, pure.

The rolling tone is obtained by a stronger lip pressure on the reed.
A double trill using a separate trill key for each hand resulting in a faster oscillation.

## auxiliary instruments

## mutes <br> $+$ <br>  <br> nonsonsons

bowed wood
bowed polystyrene
[light pressure]
[very slow bow]
bowed plastic cup
[fast, light pressure]
[bow flat]
blown tube
coffee cup on surface

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$\cap$

Where gradual stopping and glissando are indicated, do not compensate for pitch change (allow gliss to occur as a result of stopping). Where gradual stopping only is indicated, compensate for pitch change in order to maintain pitch (timbral change only).

Mutes are indicated in boxed text for brass instruments. Where mutes are indicated for auxiliary instruments (e.b. blown tubes), either the hand or another appropriate object may be used.
closed
open
blocked - as closed, but with extra pressure to seal the tube as much as possible.
A mute tremolo involving a small uneven shaking movement of the mute centred on the position(s) indicated.

Select any piece of wood (timber, found, objects, instruments), and bow as indicated with a string instrument bow. String players may use the wood of their instrument if preferred. Noise tones are preferred.

Select any piece of polystyrene and bow an edge as indicated. When sourcing polystyrene, experiment with size and density to find a rich sound.
Bow the polystyrene very lightly to produce a clearer and more stable tone
Very slow bow movement, producing a series of unpredictable clicks/noise.
A hard, thin plastic disposable drinking glass, preferable with a well defined (sharp) rim. Any size may be used. Bow one side of the rim at an angle of at least $30^{\circ}$, unless indicated. Up and down bow will produce a different sound.
A fast and light bow movement producing a sound with a clearer pitch content. Bow markings are not given with this indication given the need to use a lot of bow.
Bow flat across cup such that the bow touches the rim on opposing edges.
Select any type of straight, open tube, made from any material (e.g. cardboard tube, drinking straw, copper pipe, waste pipe, hose etc.). Any length capable of producing an audible sound may be used. When blowing, an air sound should result, possibly with a slight pitch content. This may be aided by sounding a ' $f$ ' phonetic into the tube. Do not blow in the manner of a flute or brass instrument. See above for mute information.

A standard card takeaway coffee cup. Any flat surface may be selected to be sampled by the cup (e.g. a metal sheet, polystyrene block, a brick, a wooden tray, felt etc.) using the techniques indicated use base of cup on surface
use rim of cup on surface (upside down)

| [drag] | Pull the cup across the chosen surface. Appropriate pressure for the designated volume will be |
| :--- | :--- |
| determined by the surface type. |  |
| [scratch] | A rapid back and forth friction action |
| [circle] | A friction action with a regular circular motion |

## percussion

See auxiliary instruments for other related instructions

| [push] | A constant long friction action in one direction with the hand pushing the beater/object across the |
| :--- | :--- |
| surface. The pushing action should create greater friction resulting unstable jittering, unevenness etc. |  |
| [roll] | A very rapid roll with one stick/hand only (not a conventional two stick/hand) The pace should be as fast <br> as possible, to the point where it is hard to control the regularity of the attack. All rolls should be of this <br> type, whether marked specifically in contrast to other techniques, or where no indication is made. |
| [damp] | Lightly damp crotales with finger tips to reduce upper partials. |
| [muffle] | Lightly damp timpani with finger tips |
| washing-up brush | A plastic-haired washing-up brush with relatively stiff bristles. |

## strings

diamond noteheads
[damp]
[bow tailpiece]
[bow spike]
preparations
metal preparation
wood preparation
card preparation
cloth preparation

Diamond noteheads indicate a harmonic pressure left hand fingering. The indicated pitch and roman numeral denote the position of the finger and the string to be used. This will produce a range of results from relatively clear harmonics through to (coloured) noise.
Damp all strings lightly with the fingers of the left hand. A coloured pitch/noise sound will result.
Bow the tailpiece using the indicated techniques: the sound will vary depending on their specification Place cello on lap and bow near the end of the spike, producing a low-pitched tremolo

Selection and placement of the exact objects to be used when preparing instruments is at the discretion of the players. Aim for maximum variety between players and avoid duplicating preparations where possible. Objects should be inserted and removed from the instrument as quietly as possible.
A small, light piece of metal (e.g. a large paper clip, cutlery, a skewer, metal ruler, small bolt etc.) should be inserted above I and IV and below II and III. The best position will be determined by the combination of instrument and object.
A small light piece of wood (e.g. a lolly stick, pencil, chopstick, toothpick, coffee stirrer etc.) should be inserted above I and IV and below II and III. The best position will be determined by the combination of instrument and object. The wood should force the non-bowed strings to vibrate sympathetically.
A small piece of paper or card should be woven between the strings over the fingerboard. The marking 'card' indicates that stings/card should be bowed over the card itself (molto sul tasto).
A small piece of cloth (any type of fabric may be used) should be woven between the strings over the fingerboard. Bow in the conventional manner.
geometria situs James Saunders
conductor (1)

| 0:00 | 9:23 | 17:35 |
| :---: | :---: | :---: |
| 0:16 | 9:36 | 17:43 |
| 0:58 | 9:41 | 17:53 |
| 1:09 | 10:11 | 18:00 |
| 1:31 | 10:26 | 18:05 |
| 2:03 | 10:37 | 18:41 |
| 2:11 | 11:32 | 18:44 |
| 2:23 | 12:05 | 18:48 |
| 3:02 | 13:06 | 19:23 |
| 3:34 | 13:25 | 19:38 |
| 3:43 | 13:31 | 19:53 |
| 3:48 | 13:41 | 19:59 |
| 3:56 | 13:51 | 20:55 |
| 4:29 | 13:53 | 21:09 |
| 4:47 | 14:04 | 21:12 |
| 5:28 | 14:17 | 21:34 |
| 5:30 | 14:19 | 21:48 |
| 5:39 | 14:33 | 22:14 |
| 5:40 | 15:01 | 22:22 |
| 7:16 | 15:03 | 22:26 |
| 7:20 | 15:32 | 22:37 |
| 7:46 | 15:52 | 23:17 |
| 7:51 | 16:38 | 24:02 |
| 8:27 | 17:04 | 24:36 |
| 8:31 | 17:07 | 24:55 |
| 8:36 | 17:08 | 25:00 |
| 9:04 | 17:26 |  |

geometria situs James Saunders
conductor (2)

| 0:00 | 6:50 | 14:20 |
| :---: | :---: | :---: |
| 0:27 | 6:56 | 15:49 |
| 0:49 | 7:02 | 16:04 |
| 0:57 | 7:12 | 16:12 |
| 1:19 | 7:19 | 16:24 |
| 1:23 | 7:28 | 16:26 |
| 1:31 | 7:33 | 16:36 |
| 1:33 | 8:41 | 16:49 |
| 2:09 | 8:45 | 16:54 |
| 2:38 | 10:18 | 17:38 |
| 2:43 | 10:22 | 18:17 |
| 2:45 | 10:23 | 18:29 |
| 2:52 | 10:30 | 19:04 |
| 2:53 | 10:49 | 19:35 |
| 3:26 | 11:03 | 19:51 |
| 3:32 | 11:09 | 20:04 |
| 4:38 | 11:45 | 20:15 |
| 4:41 | 11:56 | 20:32 |
| 5:07 | 12:02 | 20:59 |
| 5:25 | 12:04 | 21:01 |
| 5:43 | 12:15 | 22:14 |
| 5:57 | 12:28 | 22:31 |
| 6:01 | 13:16 | 23:57 |
| 6:12 | 13:26 | 24:10 |
| 6:30 | 13:35 | 24:15 |
| 6:40 | 13:40 | 25:00 |
| 6:44 | 14:09 |  |

## geometria situs <br> James Saunders

conductor (3)

| 0:00 | 8:18 | 15:18 |
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| 0:52 | 8:28 | 15:47 |
| 0:55 | 9:03 | 16:25 |
| 1:14 | 9:16 | 16:34 |
| 1:41 | 9:25 | 16:39 |
| 1:50 | 9:27 | 16:48 |
| 1:54 | 9:37 | 17:02 |
| 1:58 | 9:57 | 17:41 |
| 2:29 | 9:59 | 18:00 |
| 2:34 | 10:20 | 18:08 |
| 2:57 | 10:36 | 18:34 |
| 3:15 | 10:55 | 18:44 |
| 3:57 | 11:32 | 19:47 |
| 4:07 | 11:36 | 20:10 |
| 4:17 | 11:49 | 20:24 |
| 4:35 | 12:02 | 20:27 |
| 4:40 | 12:04 | 20:43 |
| 5:07 | 12:39 | 20:44 |
| 5:23 | 12:40 | 21:09 |
| 5:44 | 13:01 | 21:33 |
| 6:24 | 13:13 | 22:02 |
| 6:48 | 13:41 | 23:07 |
| 6:59 | 13:50 | 23:23 |
| 7:04 | 13:51 | 23:42 |
| 7:50 | 14:14 | 24:04 |
| 7:54 | 14:55 | 25:00 |
| 8:03 | 14:57 |  |

geometria situs James Saunders
conductor (4)

| 0:00 | 9:02 | 18:40 |
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| 0:13 | 9:39 | 19:03 |
| 0:19 | 9:53 | 19:16 |
| 0:24 | 10:07 | 19:39 |
| 0:35 | 10:42 | 20:04 |
| 0:46 | 11:17 | 20:05 |
| 0:51 | 11:30 | 20:12 |
| 1:13 | 11:42 | 20:21 |
| 1:16 | 12:05 | 20:41 |
| 2:20 | 12:10 | 21:47 |
| 2:25 | 12:54 | 21:50 |
| 3:01 | 13:14 | 21:50 |
| 3:15 | 13:15 | 22:44 |
| 4:00 | 13:16 | 22:59 |
| 4:01 | 13:26 | 23:16 |
| 4:42 | 14:49 | 23:49 |
| 4:44 | 14:58 | 23:52 |
| 5:18 | 15:05 | 23:55 |
| 5:38 | 15:21 | 24:30 |
| 5:40 | 15:36 | 24:30 |
| 5:41 | 16:01 | 24:40 |
| 5:57 | 16:05 | 25:00 |
| 6:32 | 16:36 |  |
| 6:35 | 16:37 |  |
| 6:41 | 17:33 |  |
| 6:48 | 17:36 |  |
| 7:06 | 18:13 |  |
| 8:03 | 18:24 |  |
| 8:21 | 18:28 |  |

geometria situs James Saunders
conductor (5)

| 0:00 | 8:52 | 18:06 |
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| 0:13 | 9:13 | 18:10 |
| 1:00 | 9:22 | 18:15 |
| 2:14 | 9:52 | 18:38 |
| 2:15 | 10:26 | 18:42 |
| 2:46 | 10:33 | 19:14 |
| 3:14 | 10:45 | 19:17 |
| 3:43 | 11:09 | 19:20 |
| 4:03 | 11:16 | 19:31 |
| 4:20 | 11:17 | 19:33 |
| 4:36 | 11:28 | 19:40 |
| 4:43 | 11:42 | 20:29 |
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| 5:04 | 12:16 | 20:48 |
| 5:30 | 12:26 | 21:14 |
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| 8:37 | 17:28 | 24:52 |
| 8:42 | 17:36 | 25:00 |
| 8:49 | 18:05 |  |

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## geometria situs

James Saunders
flute (1)


## geometria situs

James Saunders
flute (2)


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James Saunders
flute (3)


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James Saunders
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* any audible trill fingering


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flute (20)


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## geometria situs

James Saunders
oboe (1)


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## James Saunders

oboe (3)


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## James Saunders

clarinet (1)


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James Saunders
clarinet (2)


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clarinet (7)


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James Saunders
bass clarinet (1)


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bassoon (1)


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bassoon (16)


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bassoon (17)


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James Saunders
bassoon (18)


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James Saunders
horn (1)


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James Saunders
horn (2)


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horn (3)


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James Saunders
horn (23)


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horn (24)

geometria situs
trumpet (1)

geometria situs
trumpet (2)

geometria situs
trumpet (3)


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## James Saunders

trumpet (4)


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trumpet (5)


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trumpet (7)


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James Saunders
trumpet (9)


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James Saunders
trumpet (16)


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## James Saunders

trumpet (17)


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## James Saunders

trumpet (18)


## geometria situs

trombone (1)


## geometria situs

James Saunders
trombone (2)


## geometria situs

trombone (3)


## geometria situs

James Saunders
trombone (4)


## geometria situs

## James Saunders

trombone (5)


## geometria situs

James Saunders
trombone (6)


## geometria situs

## James Saunders

trombone (7)


## geometria situs

## James Saunders

trombone (8)


## geometria situs

James Saunders
trombone (9)


## geometria situs

trombone (10)

geometria situs

## James Saunders

trombone (11)

geometria situs

## James Saunders

trombone (12)


## geometria situs

## James Saunders

trombone (13)


## geometria situs

## James Saunders

trombone (14)


## geometria situs

## James Saunders

trombone (15)


## geometria situs

James Saunders
trombone (16)

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## geometria situs

trombone (17)


## geometria situs

James Saunders
trombone (18)


## geometria situs

James Saunders
trombone (19)


## geometria situs

James Saunders
trombone (20)


## geometria situs

trombone (21)


## geometria situs

trombone (22)

geometria situs
trombone (23)

geometria situs

## James Saunders

trombone (24)


## geometria situs

James Saunders
tuba (1)


## geometria situs

James Saunders
tuba (2)


## geometria situs

James Saunders
tuba (3)


## geometria situs

James Saunders
tuba (4)


## geometria situs

## James Saunders

tuba (5)


## geometria situs

James Saunders
tuba (6)

geometria situs
James Saunders
tuba (7)

geometria situs

## James Saunders

tuba (8)


## geometria situs

## James Saunders

tuba (9)


## geometria situs

James Saunders
tuba (10)


## geometria situs

James Saunders
tuba (11)


## geometria situs

## James Saunders

tuba (12)

geometria situs

## James Saunders

percussion (1)

geometria situs

## James Saunders

percussion (2)


## geometria situs

## James Saunders

percussion (3)

geometria situs
percussion (4)

geometria situs

## James Saunders

percussion (5)


## geometria situs

## James Saunders

percussion (6)

geometria situs
percussion (7)


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## James Saunders

percussion (8)

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percussion (10)


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percussion (11)

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percussion (12)


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## James Saunders



## geometria situs

## James Saunders

percussion (14)


## geometria situs

## James Saunders



## geometria situs

## James Saunders



## geometria situs

## James Saunders

percussion (17)


## geometria situs

## James Saunders

percussion (18)


## geometria situs

percussion (19)


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James Saunders
percussion (20)


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## James Saunders

percussion (21)


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## James Saunders

percussion (22)


## geometria situs

James Saunders
percussion (23)


## geometria situs

percussion (24)


## geometria situs

James Saunders
timpani (1)


## geometria situs

## James Saunders

timpani (2)


## geometria situs

## James Saunders

timpani (3)


## geometria situs

## James Saunders

timpani (4)


## geometria situs

## James Saunders

timpani (5)


## geometria situs

James Saunders
timpani (6)


## geometria situs

James Saunders
timpani (7)

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## geometria situs

## James Saunders

timpani (8)

geometria situs

## James Saunders

blown tube (1)


## geometria situs

## James Saunders

blown tube (2)


## geometria situs

## James Saunders

blown tube (3)


## geometria situs

## James Saunders

blown tube (4)

geometria situs

## James Saunders

blown tube (5)


## geometria situs

## James Saunders

blown tube (6)


## geometria situs

## James Saunders

bowed plastic cup (1)


## geometria situs

## James Saunders

bowed plastic cup (2)


## geometria situs

## James Saunders

bowed plastic cup (3)


* change bow direction as necessary


## geometria situs

## James Saunders

bowed plastic cup (4)


## geometria situs

## James Saunders

bowed plastic cup (5)


## geometria situs

## James Saunders

bowed polystyrene (1)


## geometria situs

## James Saunders

bowed polystyrene (2)


## geometria situs

## James Saunders

bowed polystyrene (3)


## geometria situs

## James Saunders

bowed polystyrene (4)


## geometria situs

## James Saunders

bowed polystyrene (5)


## James Saunders

bowed wood (1)


## geometria situs

James Saunders
bowed wood (2)


## geometria situs

James Saunders
bowed wood (3)

geometria situs

## James Saunders

bowed wood (4)


## geometria situs

## James Saunders

bowed wood (5)

geometria situs

## James Saunders

bowed wood (6)


## geometria situs

## James Saunders

bowed wood (7)


## geometria situs

## James Saunders

bowed wood (8)


## James Saunders

coffee cup on surface (1)


## James Saunders

coffee cup on surface (2)

geometria situs

## James Saunders

coffee cup on surface (3)


## James Saunders

coffee cup on surface (4)


## geometria situs

## James Saunders

coffee cup on surface (5)


## James Saunders

coffee cup on surface (6)

geometria situs
violin (1)


## geometria situs

James Saunders
violin (2)


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James Saunders
violin (3)


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James Saunders
violin (4)


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James Saunders
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James Saunders
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## James Saunders

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## James Saunders

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violin (47)


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## James Saunders

violin (57)

geometria situs
James Saunders
viola (1)


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James Saunders
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James Saunders
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viola (57)

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geometria situs
cello (2)


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James Saunders
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## James Saunders

cello (49)


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## James Saunders

cello (59)


## geometria situs

James Saunders
cello (60)


## geometria situs

James Saunders
double bass (1)


## geometria situs

double bass (2)


## geometria situs

## James Saunders

double bass (3)


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## James Saunders

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## geometria situs

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## geometria situs

## James Saunders

double bass (34)


## geometria situs

double bass (35)


## geometria situs

double bass (36)


## geometria situs

double bass (37)


## geometria situs

double bass (38)


## geometria situs

double bass (39)


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## geometria situs

## James Saunders

double bass (41)


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double bass (42)


## geometria situs

James Saunders
double bass (43)


## geometria situs

double bass (44)


## geometria situs

## James Saunders

double bass (45)


## geometria situs

double bass (46)


