

Astronomy Podcasting

George J. Bendo

Podcasts are audio programs that meet the following criteria:

- The programs are in an audio (not video) format.
- The audio is distributed using the internet.
- The audio material is episodic (not continuous).
- The distribution system uses RSS feeds.

Podcasts could otherwise be any length and cover any topic (music, history, sports, news, science, comedy, fiction, etc.).

Podcasts were originally invented in 2004 by Adam Curry (who played music videos on MTV in the 1980s) and David Winer (a software developer).

The name “podcast” was invented by journalist Ben Hammersley about a month after the podcast was invented.

About 5 million podcasts with 70 million episodes currently exist.

Multiple space and astronomy podcasts are available online in the English language:



365 Days of Astronomy



The Supermassive Podcast



Ask a Spaceman



Universe Today



Astronomy Cast



Awesome Astronomy



Cheap Astronomy



Naked Astronomy



The Orbital Mechanics



Space Nuts



Star Diary



StarTalk Radio

It is possible to find multiple astronomy and space podcasts in a few other languages (e.g., Spanish, French, Japanese).

In Turkish, I found the following:



Uzay Hakkında Her Şey! Rege ile Uzay [currently inactive]



Dinçer Güner ile Minik Astro Tüyolar

In Urdu, I found the following:



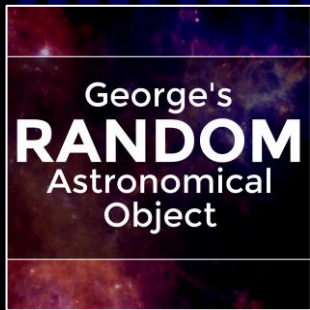
Hamari Kainat

I could not find astronomy or space podcasts in Farsi, Kazakh, or Uzbek. (I also had problems searching for Georgian language astronomy podcasts.)

I personally have been involved with two podcasts.



The Jodcast
www.jodcast.net



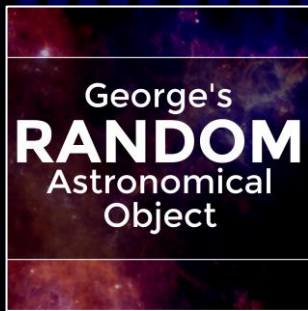
George's Random Astronomical Object
www.randomastronomicalobject.com



The Jodcast was started by postgraduate students at Jodrell Bank Observatory in 2006. Since it was one of the few astronomy podcasts when it started, it tried to cover multiple topics (news in astronomy, astronomy research, amateur stargazing, and question and answer sessions).

I started working with the Jodcast in 2012 and became a regular contributor, which included editing and producing the podcast.

Unfortunately, people had difficulty producing the Jodcast during the pandemic, and its last episode was published in December 2021.



I created George's Random Astronomical Object on my own. The first episode was published in August 2019.

The episodes discuss individual astronomical objects that are selected randomly. The idea was to discuss astronomical objects (and astronomy concepts) that are generally not covered by other astronomy media published for the general public (books, TV programs, podcasts, etc.).

The episodes are published once every two weeks. The final episodes are typically 5-15 minutes in length. I record and edit the audio myself.

The rest of this presentation is focused on producing a podcast (particularly an astronomy or science podcast) based mainly on my experience.

The following steps are needed to create a new podcast:

- **Concept**
- **Cover Art**
- **Scripting**
- **Recording**
- **Editing**
- **Website**
- **Distribution**
- **Publicity**

Concept

Any podcast should be created with some basic idea of what the podcast is going to be. This involves making several basic choices about the podcast:

- What will the podcast be named?
- What subject will the podcast cover?
- Who is the podcast aimed at?
- What language will the podcast be in?
- Who will speak on the podcast? How many people will be speaking?
- What type of format will be used (monologue, conversational, questions and answers, etc.)?
- How long will each podcast episode be?
- Who will edit the podcast and take care of the publishing?
- How frequently will the podcast be published?

The subject matter and format could vary significantly. For example, an astronomy podcast could be set up as one of the following:

- One person describing the monthly night sky for amateur stargazers.
- One person describing deep sky observing for experienced amateur astronomers with telescopes.
- One person describing the myths associated with the constellations in the night sky.
- Two or more people teaching basic astronomy concepts for people who do not understand astronomy.
- Two people discussing recent news in astronomy or space exploration.
- One person interviewing a different professional astronomer in each episode about their research.
- Two people discussing questions about astronomy from the general public.

Keep in mind that a lot of astronomy podcasts already exist, so to create a new podcast that distinguishes itself from other podcasts, it would be useful to do something different:

- Cover different subject matter from other podcasts.
- Discuss material relevant to a specific location (e.g. astronomy in the place where you are from).
- Produce a podcast in a different language (not English, for example).
- Produce material in a different format (for example, using music).

Also keep in mind that different podcasts will age differently:

- Podcasts about recent events (for example, the latest astronauts to travel into space) or about time-dependent activities (for example, observing the night sky on a different month) will not be worth listening to about a month after they have been published.
- Podcasts about broader concepts (for example, the latest research activities of professional astronomers) will last for much longer, but some topics may get out of date after a few years.
- Podcasts discussing more general topics (basic astronomy concepts) should last for a very long time.

The length of a podcast could be as short as 5 minutes or as long as 6 hours.

Podcasts could be released on various timescales, including once every day, once every week, or once every month.

Keep in mind that if you produce too much audio material (either too many podcasts or podcasts that are too long), it might be too difficult for people to listen to everything.

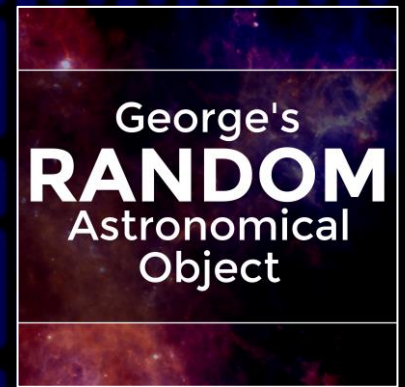
Also keep in mind that you need to be able to actually produce your podcast. Recording and editing can take an amount of time several times longer than the podcast itself. Don't publish a 1 hour podcast every week if you don't have the time to do this.

Related to this, do not make your podcast too complicated or require work from too many people. This will make the podcast very difficult to produce.

Very importantly, try to publish the podcast on a regular schedule and on time.

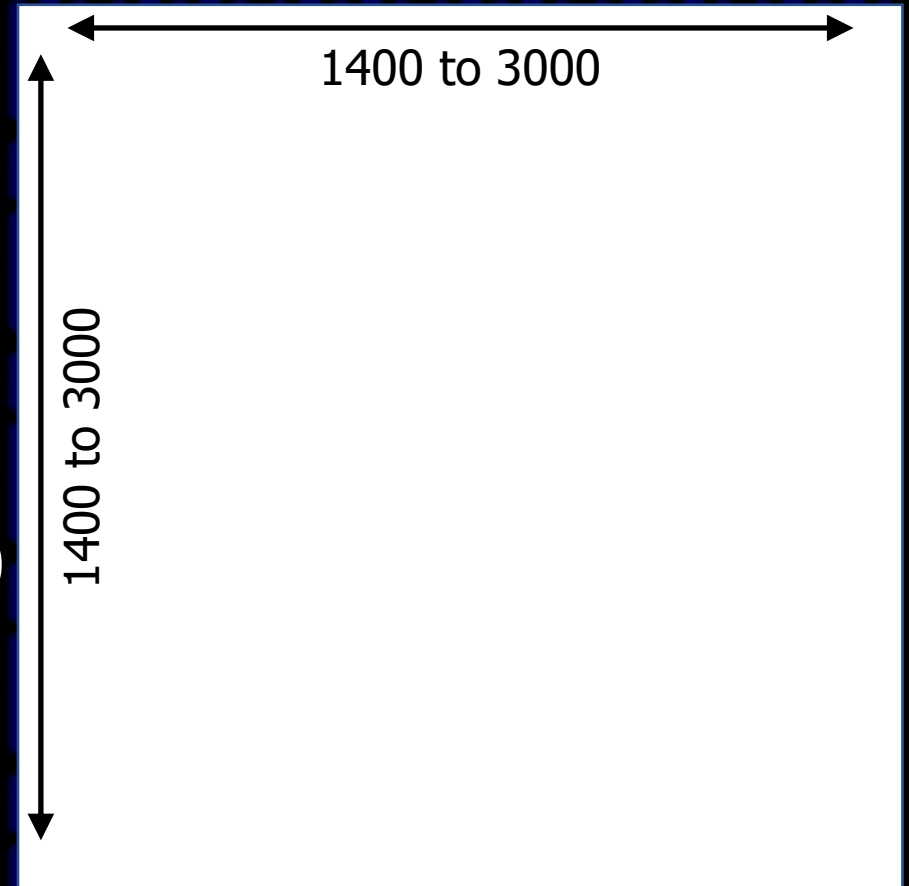
Cover Art

Podcasts need a logo to represent their podcast and to attach to the audio file.

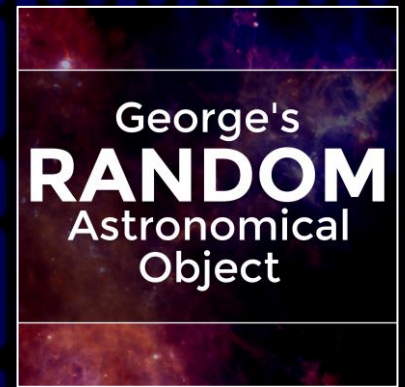


From a technical standpoint, the cover art should be formatted as follows:

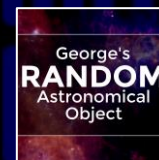
- Square.
- 1400 x 1400 to 3000 x 3000 in size.
- JPG or PNG format.



From a design standpoint, I strongly recommend including the title in the cover art and using a font that is large and easy to read. Including other graphics in the image would help to make it stand out.



Very importantly, make the text and design easy to see when the cover art is shrunk to a very small size (for example, 2 cm x 2 cm). Do not include too much detail or use fonts that are too complex.



Scripting

For most formats, it would be useful to have a script for the podcast.

For some formats (like a casual conversation), a detailed script may not be necessary, although it will still be very helpful to write down some details for discussion.

For other formats (like a monologue or a question-and-answer format), it may be much better to write a complete script first.

A typical podcast may follow a basic format like the following:

Introduction (the name of the podcast, the presenters, and the website)

Science Content

Listener Feedback

End credits (the names of the editors, other contributors, etc.)

The scripts and format for each episode do not necessarily need to follow exactly the same format.

For your podcast's website, it would be useful to have a transcript of each of your episodes. (Some people may be more interested in reading your podcast's transcripts than listening to the episodes.)

Also, try to find references for everything you say on your podcast, and try to place that information on your website.

Recording

While it is possible to record using the microphone built into a phone or laptop computer, the sound quality may not necessarily be very good (but if it is, that's OK).

Most beginner podcasters will buy a USB microphone.

I use two different microphones:

- Blue Yeti
 - For recording at home
 - €130
- Samson Q2U
 - Portable microphone
 - €60

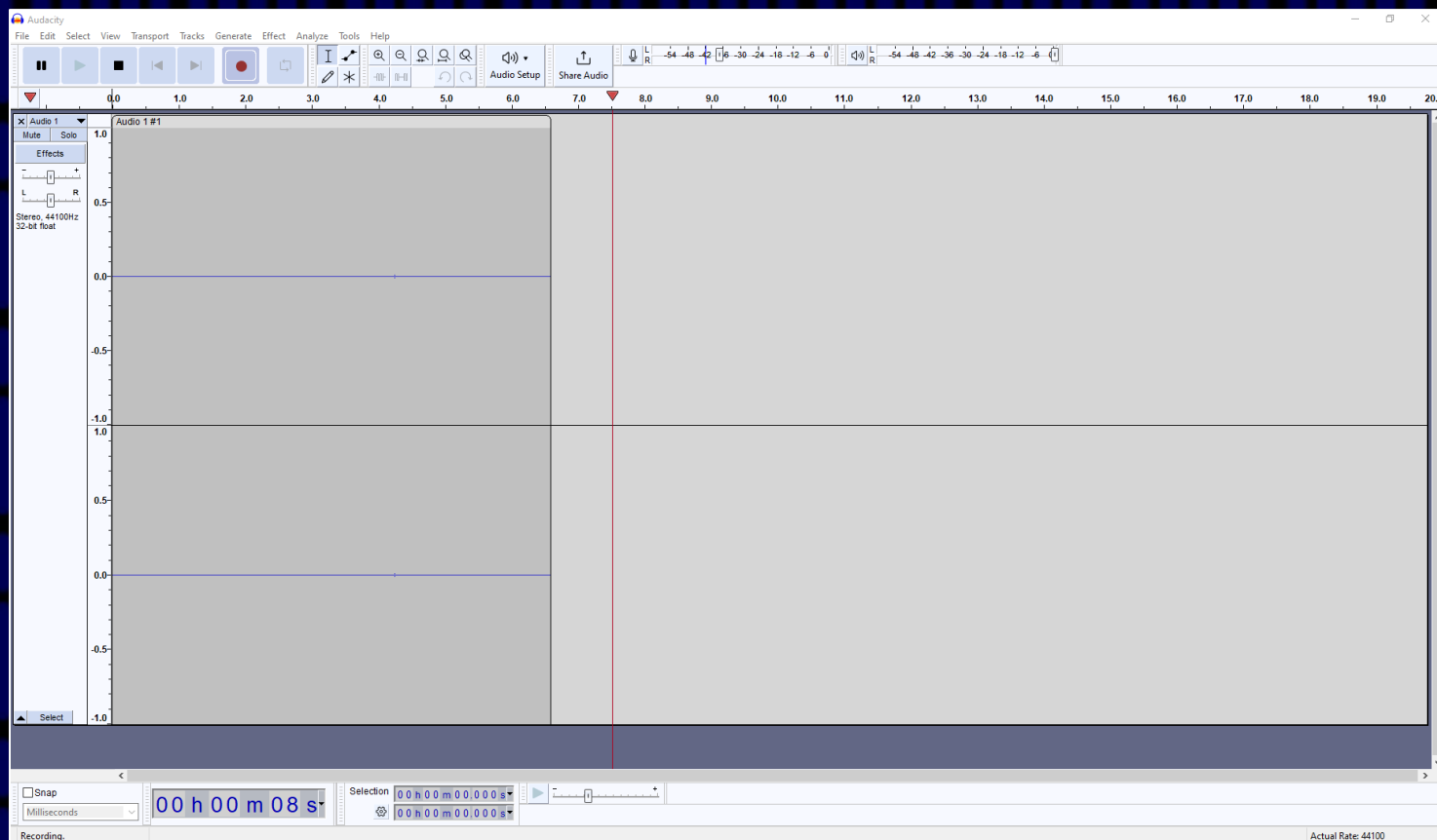


I also use a sound shield at home.



I make recordings using Audacity (www.audacityteam.org), which is free to use.

Audacity saves audio in its own format (aup3), but you should also save recorded audio in wav format.

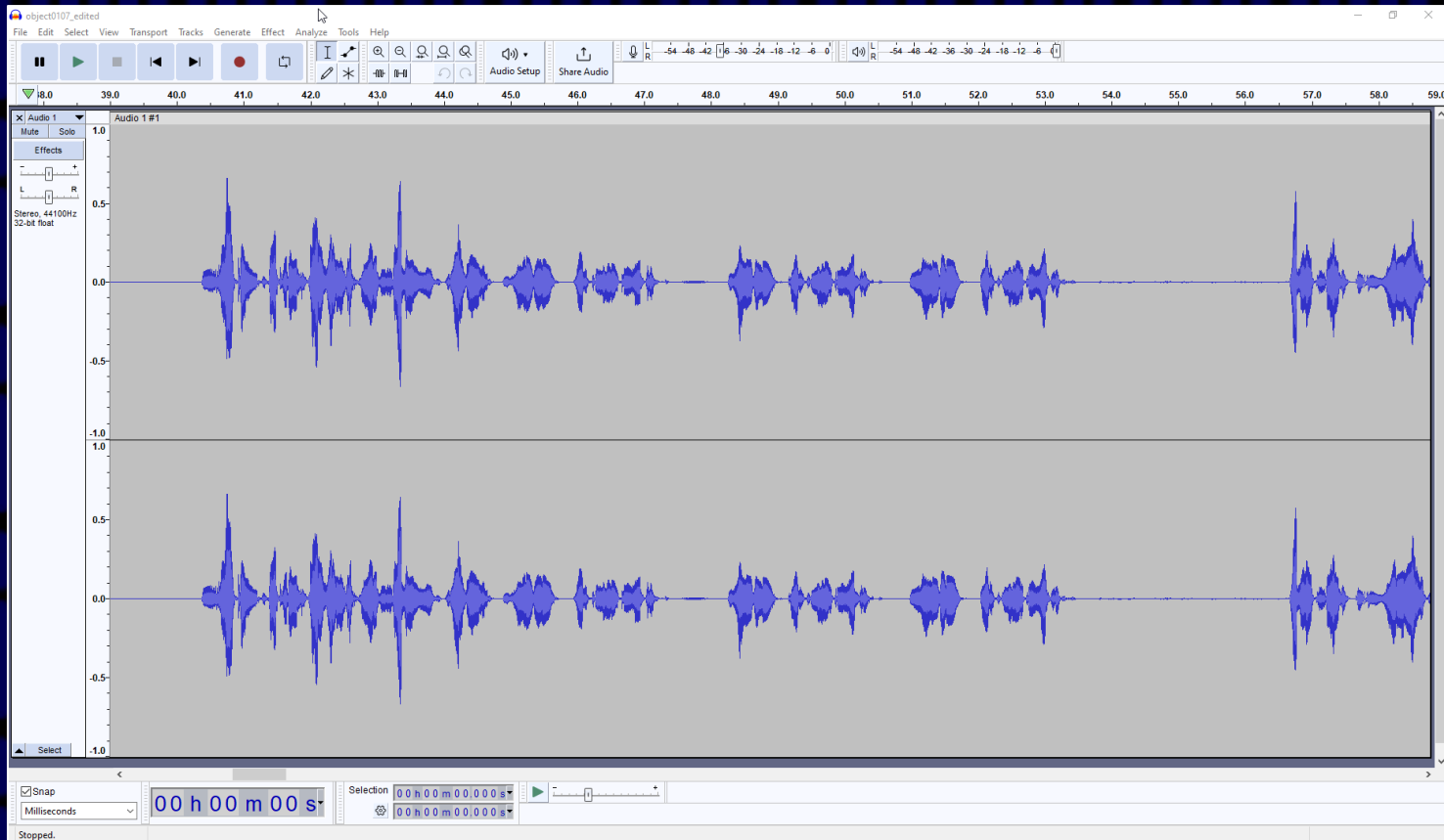


When recording, I recommend the following:

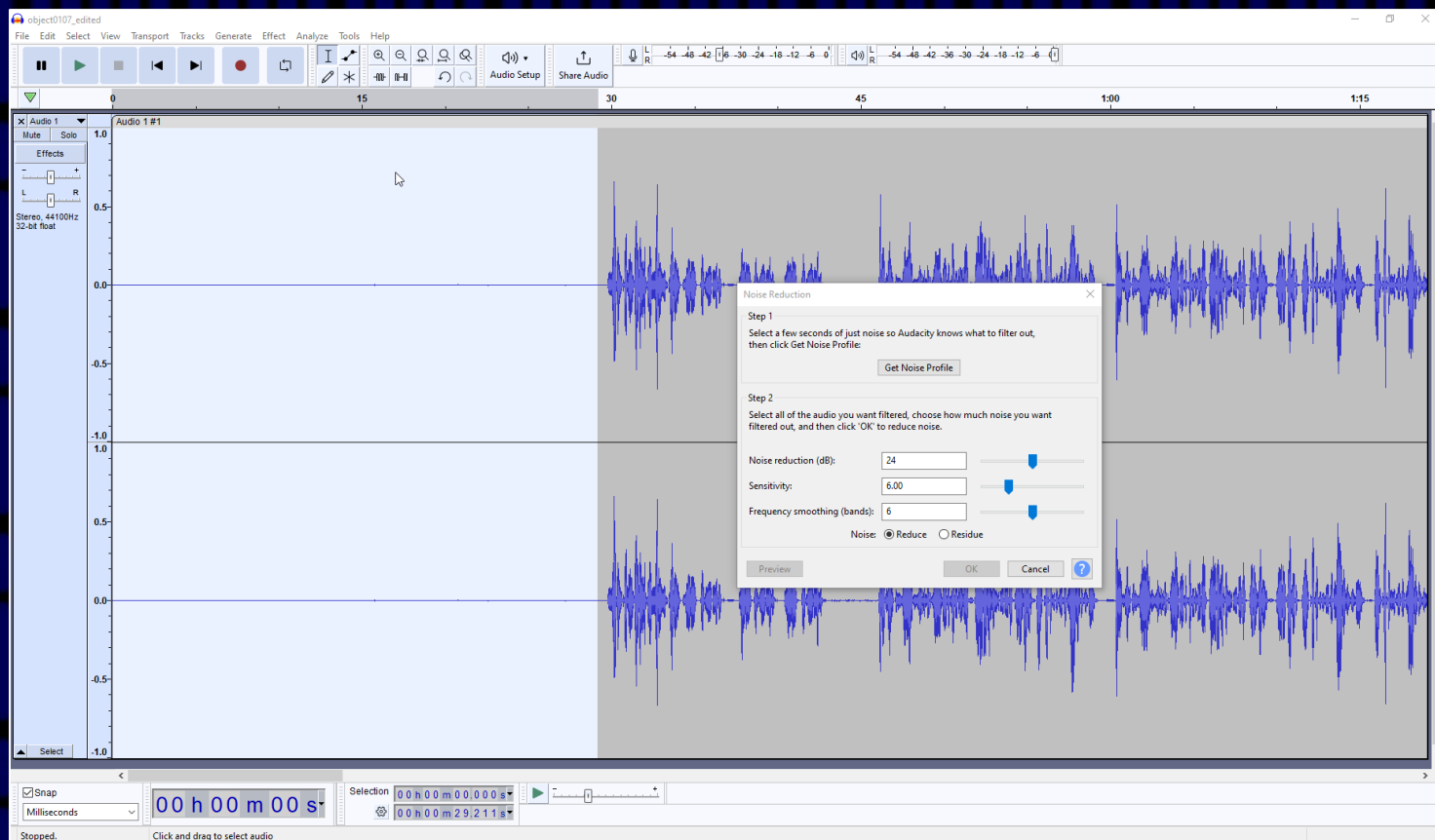
- Record 5-10 second of silence at the beginning of any audio recording. This is important for audio editing.
- Talk directly into the microphone. Do not move your head.
- Avoid moving (including making hand gestures) or making other noises.
- Talk naturally. Try to avoid sounding like you are reading.
- When recording with two or more people, people should try to only talk one at a time.
- When you make a mistake, go back to the beginning of the sentence you were saying and start over.

Editing

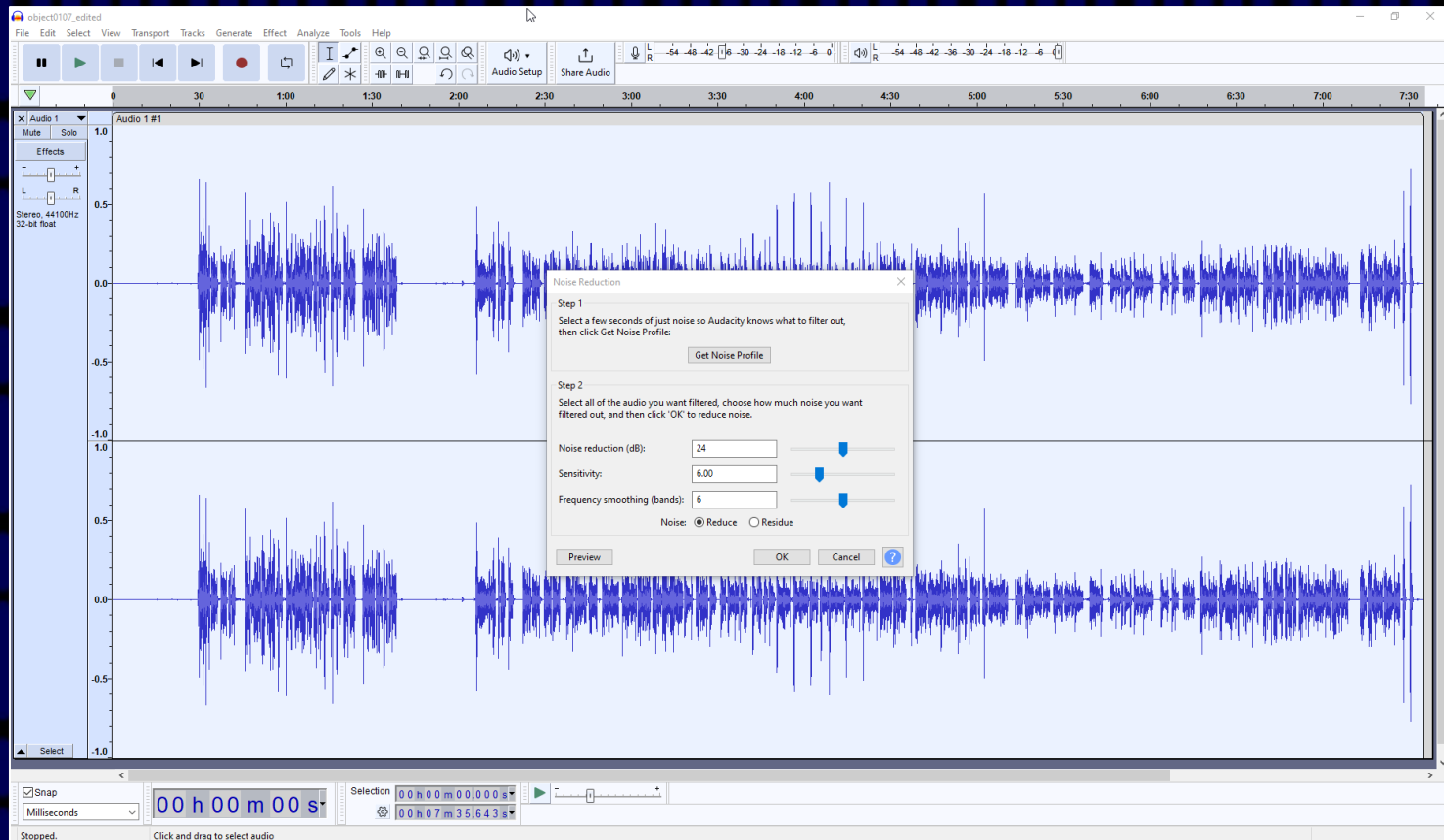
I do all of my audio editing in Audacity.



At the beginning of editing audio, I use noise removal (under Effects) to remove the noise. This involves first using the silence at the beginning of the recording to measure the noise and then selecting all audio and performing the noise removal.

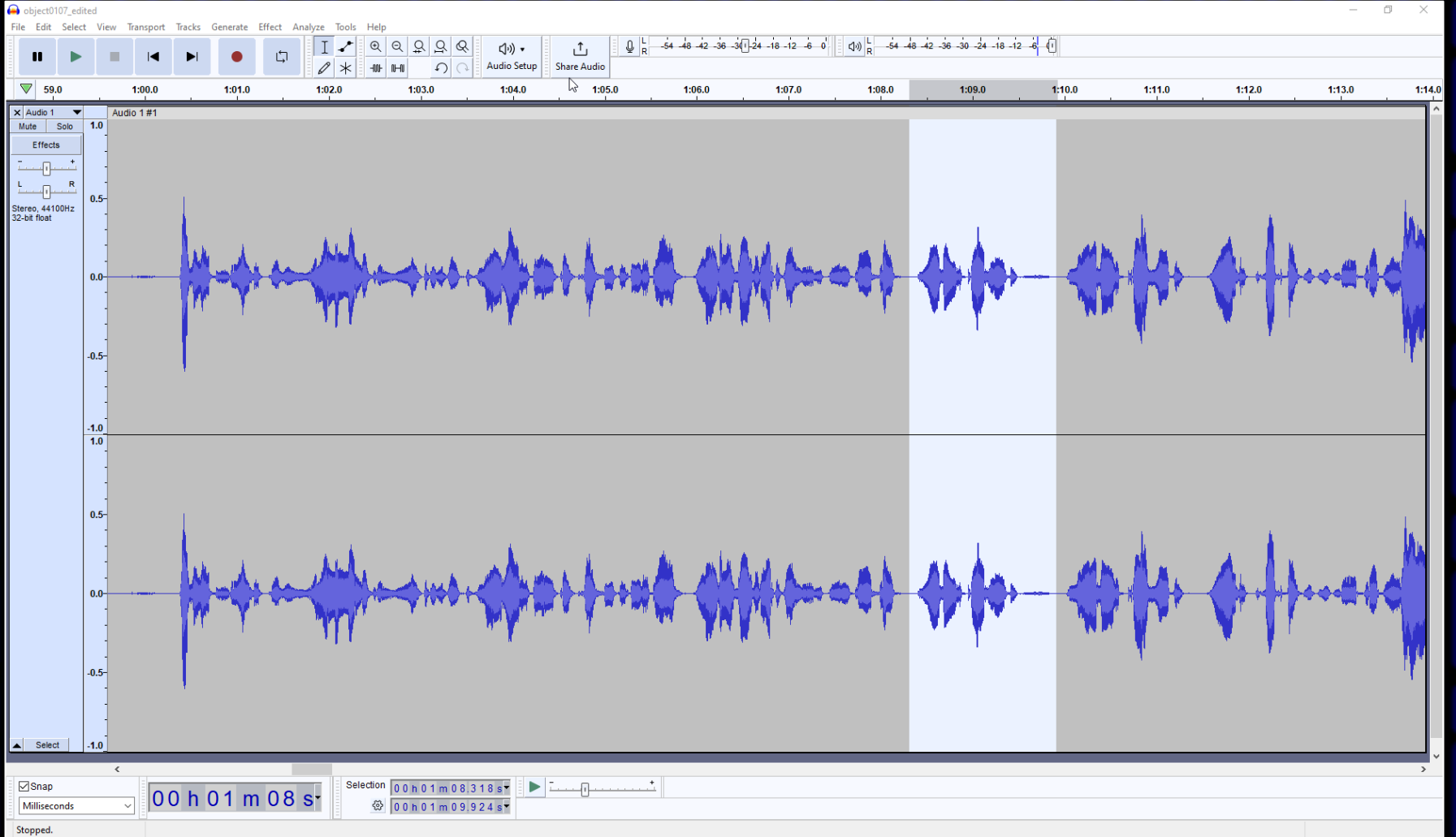


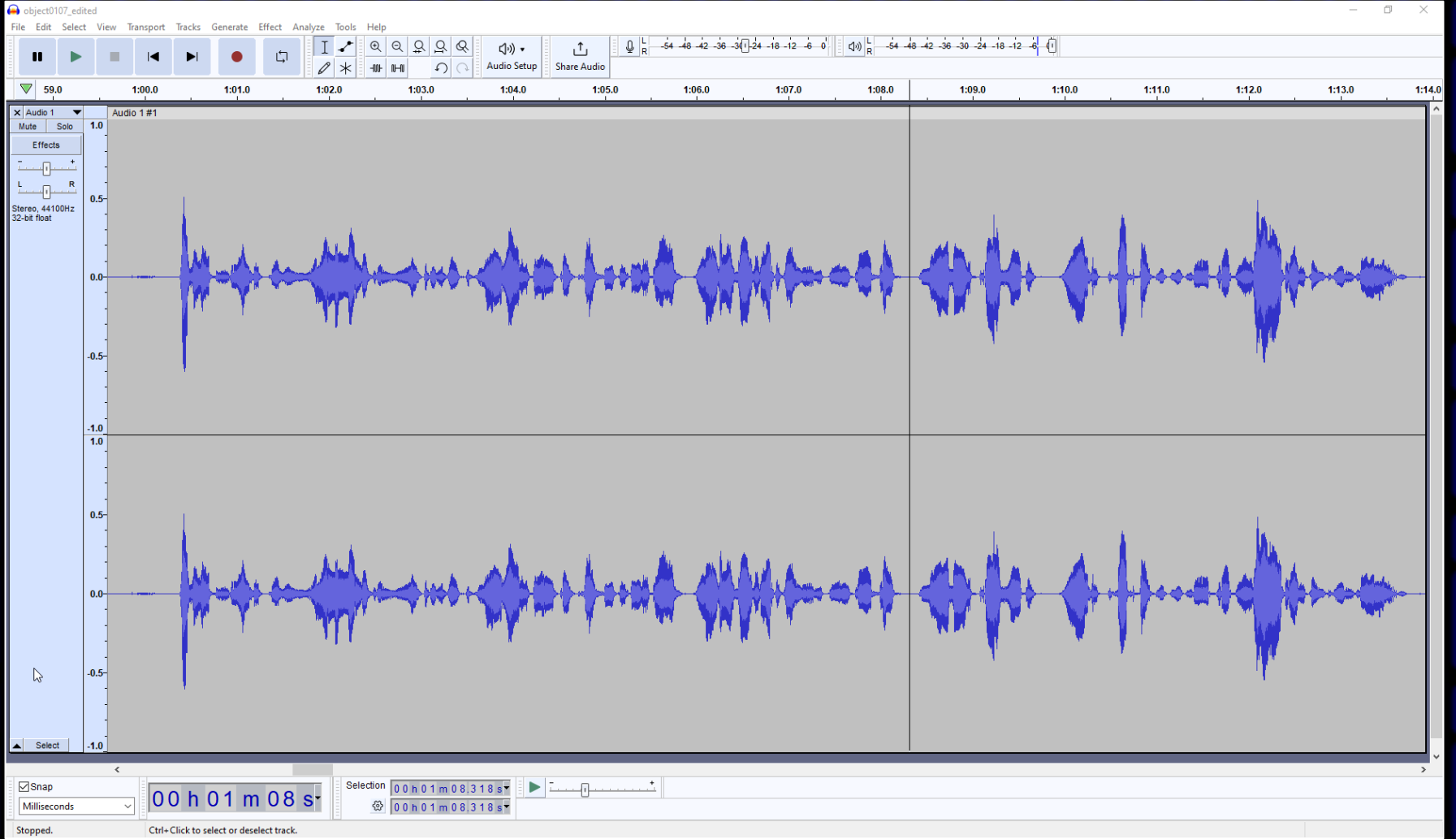
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Going from the beginning to the end, I do the following:

- Delete audio where I made mistakes.
- Delete "um", "uh", and related sounds.
- Mute breathing sounds.
- Delete or mute "mouth sounds".
- Adjust the silence between sentences, phrases in sentences, and "paragraphs". (I typically try to have 1.1 seconds between sentences.)





object0107_edited

File Edit Select View Transport Tracks Generate Effect Analyze Tools Help

0 33.5 34.0 34.5 35.0 35.5 36.0 36.5 37.0 37.5 38.0 38.5 39.0 39.5 40.0 40.5

Audio 1

Mute Solo

Effects

L R

Stereo, 44100Hz
32-bit float

Select

0.0 0.5 1.0 -0.5 -1.0

00 h 00 m 37 s

Selection 00 h 00 m 36.930 s 00 h 00 m 37.897 s

Stopped. Ctrl+ Click to select or deselect track.

object0107_edited

File Edit Select View Transport Tracks Generate Effect Analyze Tools Help

0 33.5 34.0 34.5 35.0 35.5 36.0 36.5 37.0 37.5 38.0 38.5 39.0 39.5 40.0 40.5

Audio 1

Mute Solo

Effects

L R

Stereo, 44100Hz
32-bit float

Select

0.0 0.5 1.0 -0.5 -1.0

00 h 00 m 37 s

Selection 00 h 00 m 36.930 s 00 h 00 m 37.897 s

Stopped.

object0107_edited

File Edit Select View Transport Tracks Generate Effect Analyze Tools Help

Audio Setup Share Audio

50.10 2:50.20 2:50.30 2:50.40 2:50.50 2:50.60 2:50.80 2:50.90 2:51.00 2:51.10 2:51.20 2:51.30 2:51.40 2:51.50 2:51.60 2:51.70 2:51.80 2:51.90 2:52.00 2:52.10 2:52.20 2:52.30 2:52.40 2:52.50 2:52.60 2:52.70 2:52.80 2:52.90 2:53.00 2:53.10 2:53.20 2:53.30 2:53.40 2:53.50 2:53.60 2:53.70 2:53.80

Audio 1

Mute Solo

Effects

L R

Stereo, 44100Hz
32-bit float

Select

0.0 0.5 1.0 -0.5 -1.0

0.0 0.5 1.0 -0.5 -1.0

00 h 02 m 52 s

Selection 00 h 02 m 51.768 s

00 h 02 m 51.768 s

Stopped.

The image shows a screenshot of an audio editing software interface. At the top, there is a menu bar with options: File, Edit, Select, View, Transport, Tracks, Generate, Effect, Analyze, Tools, and Help. Below the menu bar is a toolbar with various icons for playback (stop, play, mute, solo), editing (erase, copy, paste), and audio processing (audio setup, share audio). A central timeline displays time in hours, minutes, and seconds, ranging from 2:50:10 to 2:53:80. The main workspace is divided into two tracks, both labeled 'Audio 1'. Each track shows a blue waveform representing the audio signal. The vertical axis for both tracks ranges from -1.0 to 1.0. On the left side of the top track, there are controls for 'Mute' and 'Solo', an 'Effects' section with a volume knob, and stereo panning controls for 'L' and 'R'. Below the tracks, there is a 'Snap' section with a checked box and a dropdown menu set to 'Milliseconds'. A large time display shows '00 h 02 m 52 s'. To the right of this, there are 'Selection' fields showing '00 h 02 m 51.768 s' and a play button. At the bottom left, the status 'Stopped.' is visible.

object0107_edited

File Edit Select View Transport Tracks Generate Effect Analyze Tools Help

Audio Setup Share Audio

50.10 2:50.20 2:50.30 2:50.40 2:50.50 2:50.60 2:50.80 2:50.90 2:51.00 2:51.10 2:51.20 2:51.30 2:51.40 2:51.50 2:51.60 2:51.70 2:51.80 2:51.90 2:52.00 2:52.10 2:52.20 2:52.30 2:52.40 2:52.50 2:52.60 2:52.70 2:52.80 2:52.90 2:53.00 2:53.10 2:53.20 2:53.30 2:53.40 2:53.50 2:53.60 2:53.70 2:53.80

Audio 1

Mute Solo

Effects

L R

Stereo, 44100Hz
32-bit float

Select

0.0
0.5
1.0
-0.5
-1.0

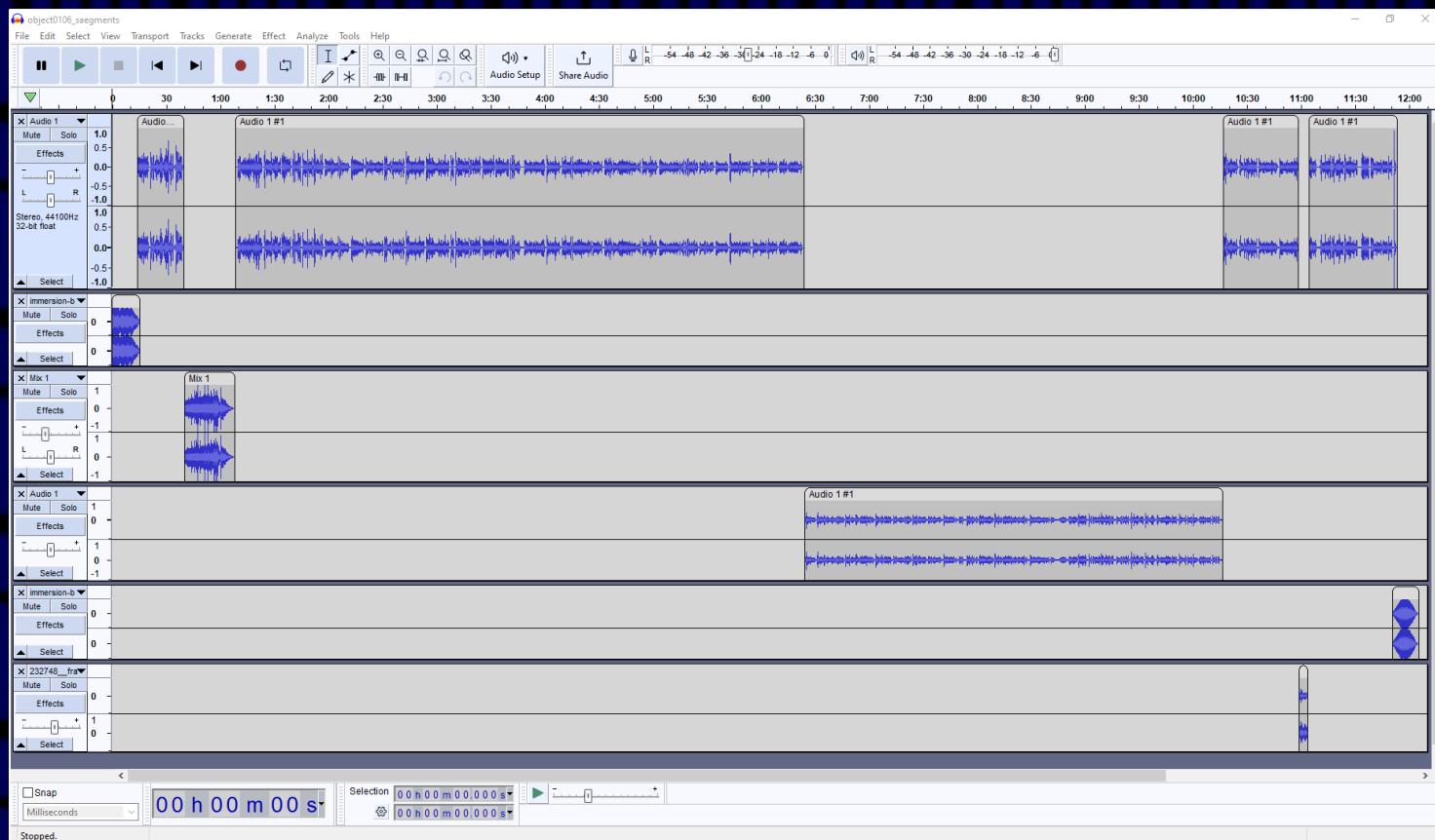
0.0 h 02 m 52 s

Selection 00 h 02 m 51.768 s

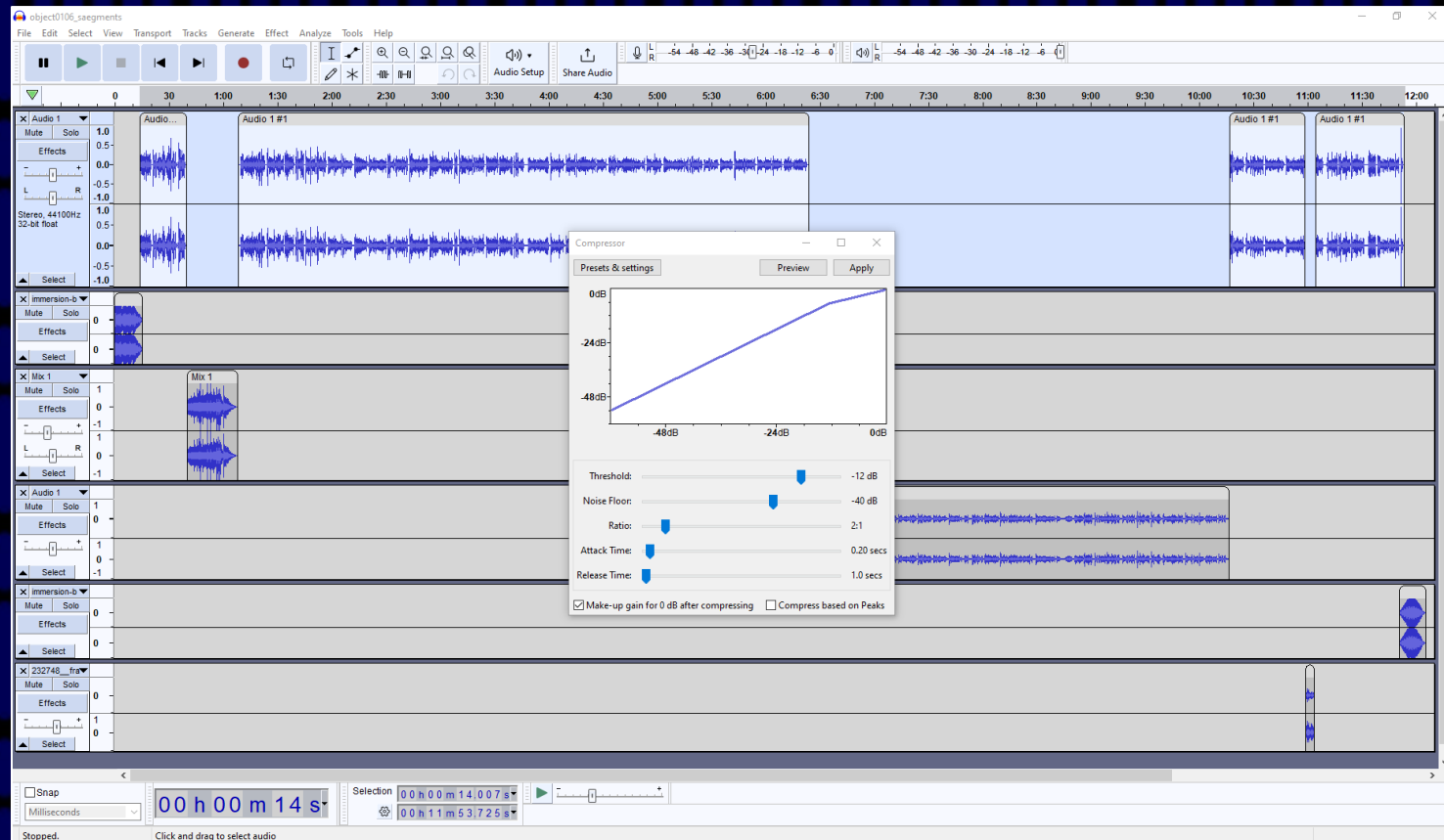
00 h 02 m 51.877 s

Stopped. Selection Tool (F1)

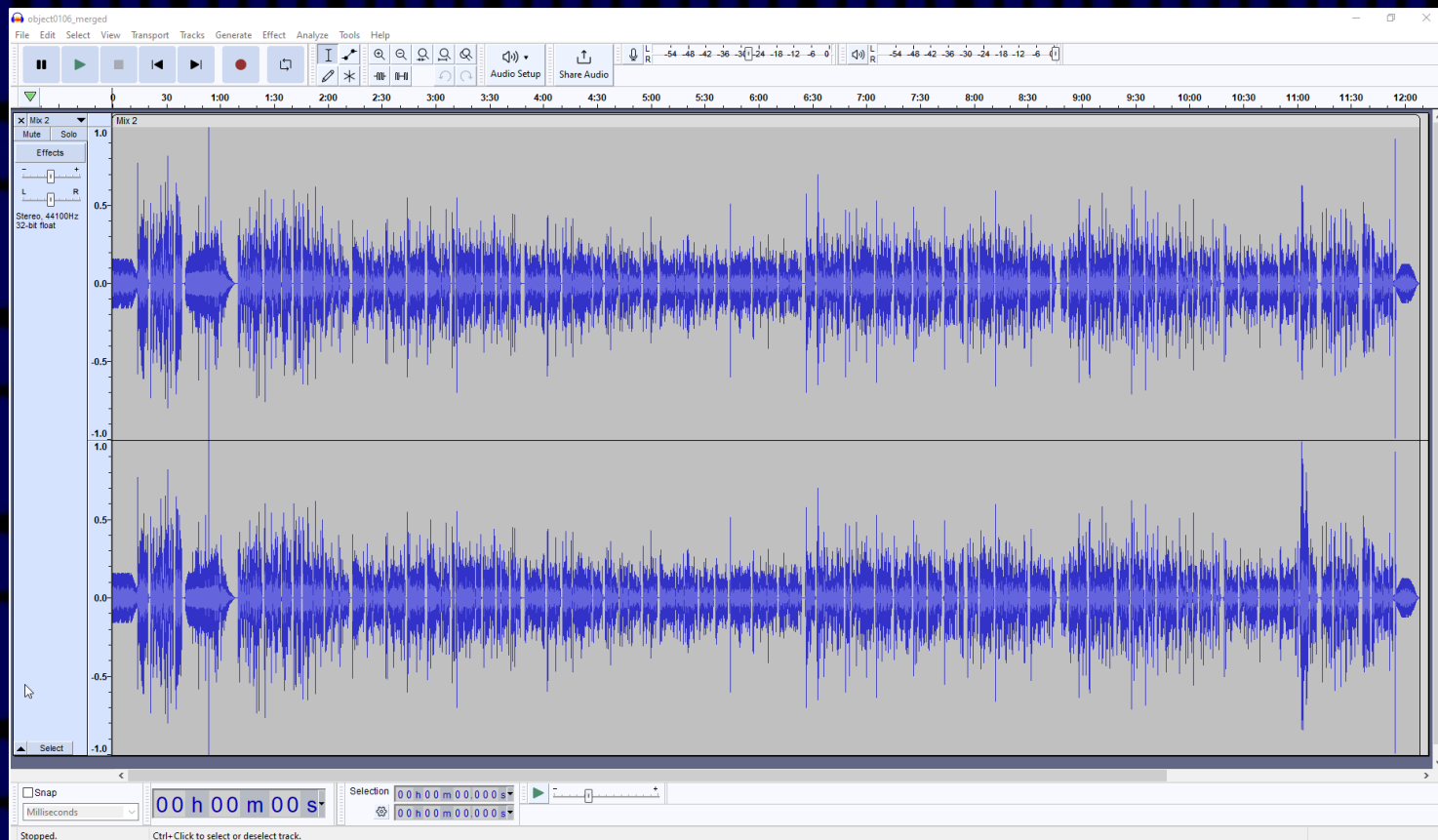
After the recorded audio is complete, I then add the music and sound effects as separate tracks. Next, I adjust the amplitudes of those tracks to match the amplitude of the vocal track.



After this, I apply dynamic compression to the vocals so that the volume throughout the vocals is consistent.

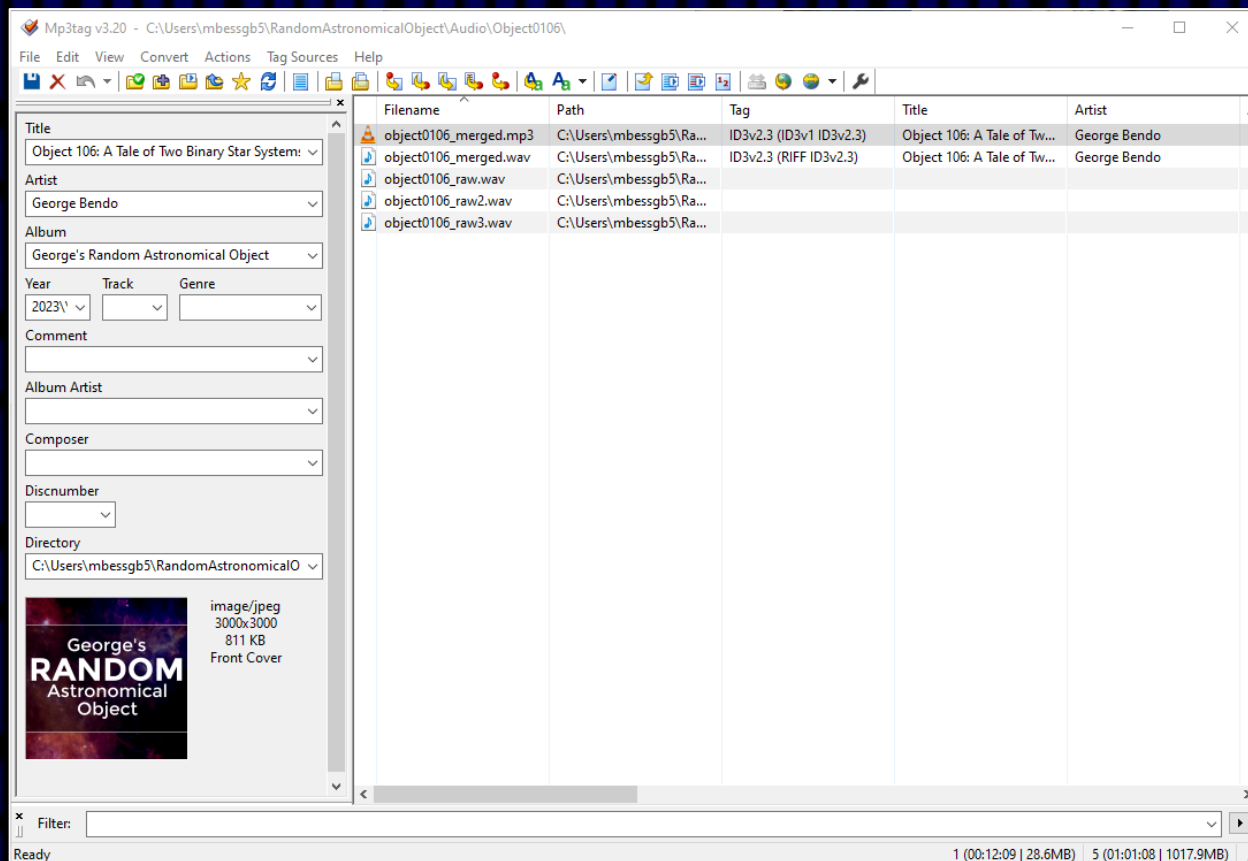


Next, I merge the tracks. I then listen to the audio again and make final adjustments to the audio.



The final podcast is exported as an mp3 where I add information on the podcast name, the episode name, the creator name, and some additional information. I also save another copy as a wav file (since wav files are lossless and mp3 are not).

I then use mp3tag to add album art to the mp3 file. At this point, the file is ready for distribution.



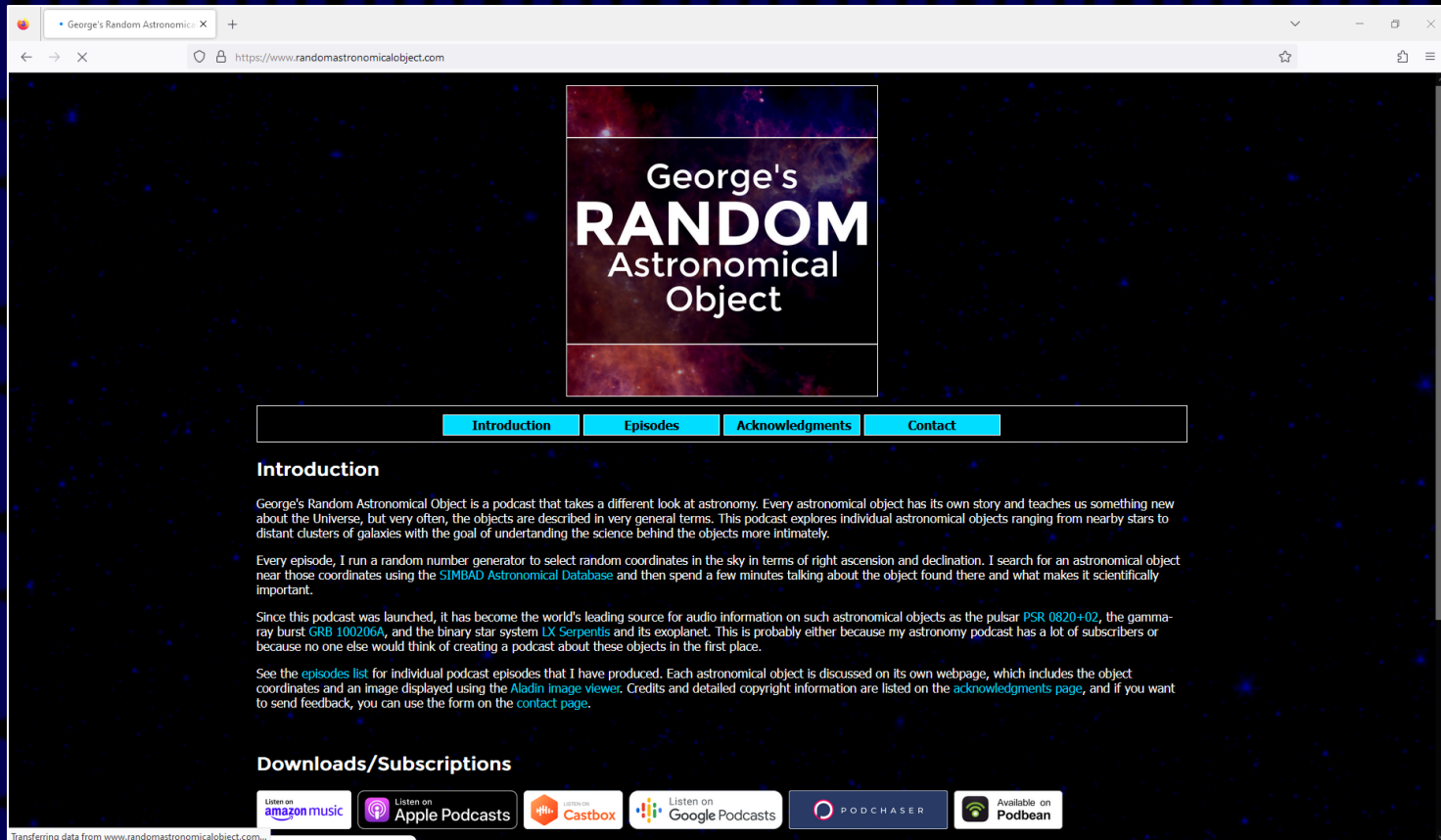
Website

All podcasts need to be placed somewhere on the web. Two general options are available:

- Create your own website and place it on a hosting platform.
- Place the podcast on a specialist podcast hosting platform.

You want your webpages to include at least the following:

- Episode list
- Transcripts for each episode
- Links to distribution websites (Spotify, Apple Podcasts, etc.)



The screenshot shows a web browser window with the URL <https://www.randomastronomicalobject.com>. The page features a central image with the text "George's RANDOM Astronomical Object". Below the image is a navigation bar with four buttons: "Introduction", "Episodes", "Acknowledgments", and "Contact". The "Introduction" section is currently active and contains the following text:

Introduction

George's Random Astronomical Object is a podcast that takes a different look at astronomy. Every astronomical object has its own story and teaches us something new about the Universe, but very often, the objects are described in very general terms. This podcast explores individual astronomical objects ranging from nearby stars to distant clusters of galaxies with the goal of understanding the science behind the objects more intimately.

Every episode, I run a random number generator to select random coordinates in the sky in terms of right ascension and declination. I search for an astronomical object near those coordinates using the [SIMBAD Astronomical Database](#) and then spend a few minutes talking about the object found there and what makes it scientifically important.

Since this podcast was launched, it has become the world's leading source for audio information on such astronomical objects as the pulsar [PSR 0820+02](#), the gamma-ray burst [GRB 100206A](#), and the binary star system [LX Serpentis](#) and its exoplanet. This is probably either because my astronomy podcast has a lot of subscribers or because no one else would think of creating a podcast about these objects in the first place.

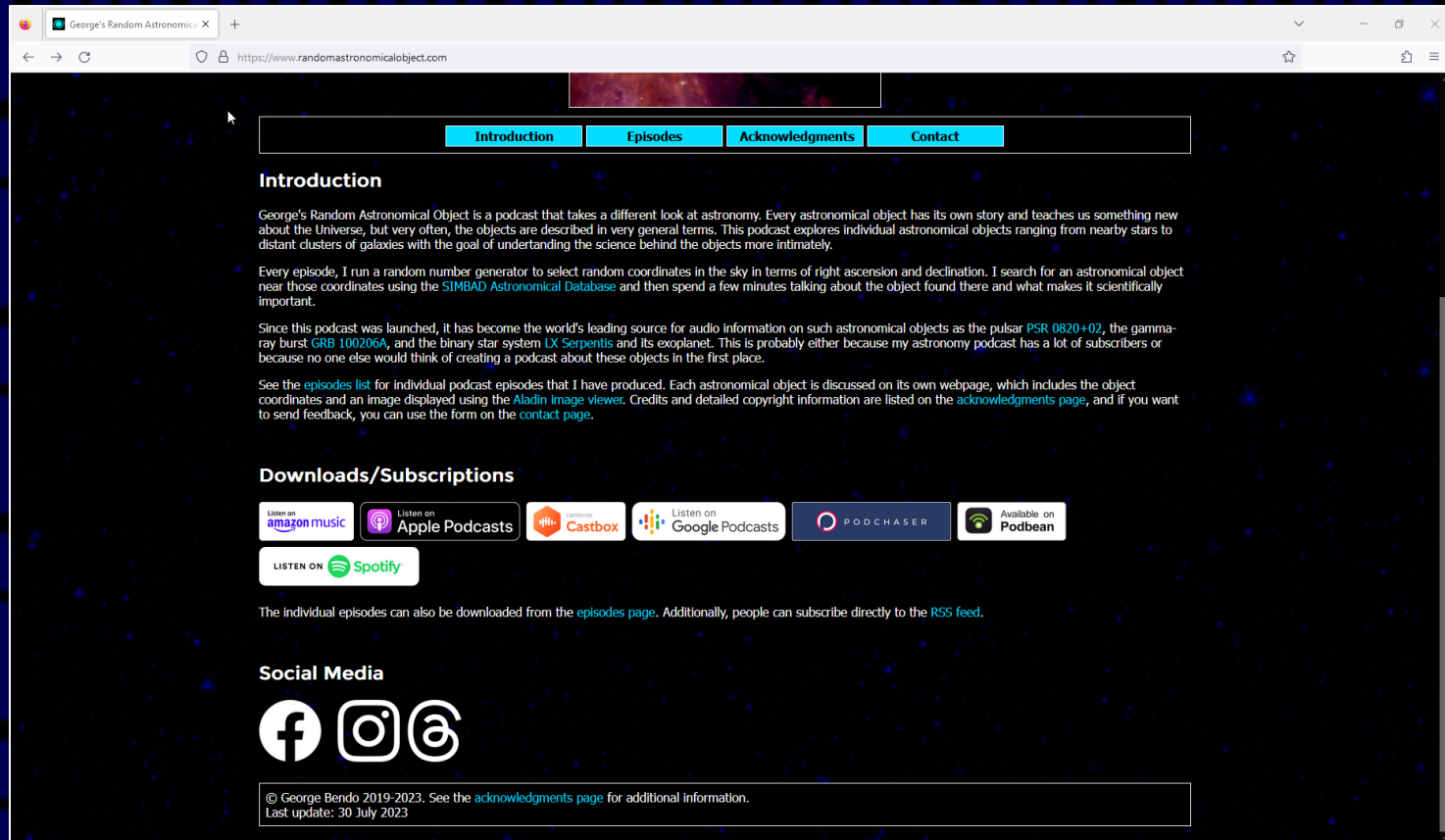
See the [episodes list](#) for individual podcast episodes that I have produced. Each astronomical object is discussed on its own webpage, which includes the object coordinates and an image displayed using the [Aladin image viewer](#). Credits and detailed copyright information are listed on the [acknowledgments page](#), and if you want to send feedback, you can use the form on the [contact page](#).

Downloads/Subscriptions

The bottom of the page features a row of logos for various podcast distribution platforms: Amazon Music, Apple Podcasts, Castbox, Google Podcasts, Podchaser, and Podbean.

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The "Downloads/Subscriptions" section includes logos for Amazon Music, Apple Podcasts, Castbox, Google Podcasts, Podchaser, and Podbean, along with a Spotify "LISTEN ON" button.

The "Social Media" section features icons for Facebook, Instagram, and YouTube.

At the bottom, a footer box contains the text: © George Bendo 2019-2023. See the [acknowledgments page](#) for additional information. Last update: 30 July 2023

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George's Random Astronomical Object

[Introduction](#) [Episodes](#) [Acknowledgments](#) [Contact](#)

Episode List

2019

Object 1: Not the Pope	Leo IV Dwarf Galaxy	12 Aug 2019	08:46	MP3
Object 2: Variable Variability	HS Hydrae	26 Aug 2019	09:00	MP3
Object 3: Room Temperature	HD 85512	09 Sep 2019	08:19	MP3
Object 4: A Damp Lyman Alpha Elephant	LBQS 0058+0155	23 Sep 2019	13:35	MP3
Object 5: Some Unexpected Helium	RV Octantis	07 Oct 2019	10:31	MP3
Object 6: Extra Peculiar	HD 98851	21 Oct 2019	08:15	MP3
Object 7: Circles within Circles	30 Arietis	04 Nov 2019	11:23	MP3
Object 8: A Misbehaving LIRG	II Zw 96	18 Nov 2019	10:58	MP3
Object 9: A Cruise Holiday with a Peculiar Carbon Star	HD 214714	02 Dec 2019	09:34	MP3
Object 10: Ram Your Jellyfish	Abell 85	16 Dec 2019	11:28	MP3
Object 11: Howling Fast Differential Rotation	Psi Capricorni	30 Dec 2019	09:06	MP3

2020

Object 12: Watching Infrared Paint Dry	ELAIS N1	13 Jan 2020	11:00	MP3
Object 13: Stellar Companion Facial Reconstruction	RV Centauri	27 Jan 2020	07:55	MP3

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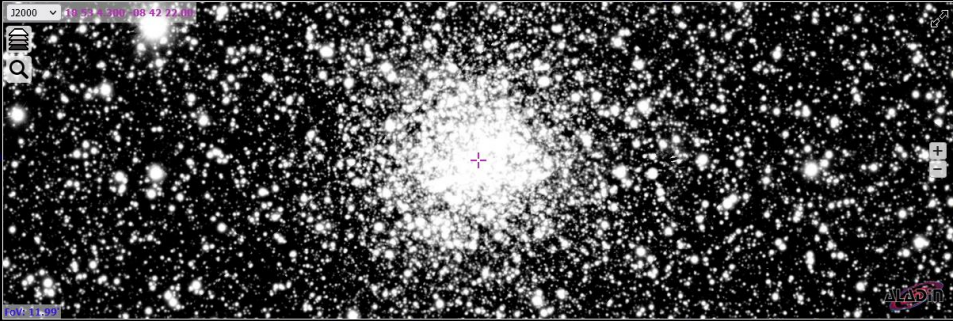
George's Random Astronomical Object

[Introduction](#) [Episodes](#) [Acknowledgments](#) [Contact](#)

Object 106: NGC 6712

Podcast (MP3)
Podcast release date: 04 September 2023

Right ascension: 18:53:04.3
Declination: -08:42:22
Epoch: J2000
Constellation: Scutum
Corresponding Earth location: The Andes in the state of Huanuco in Peru

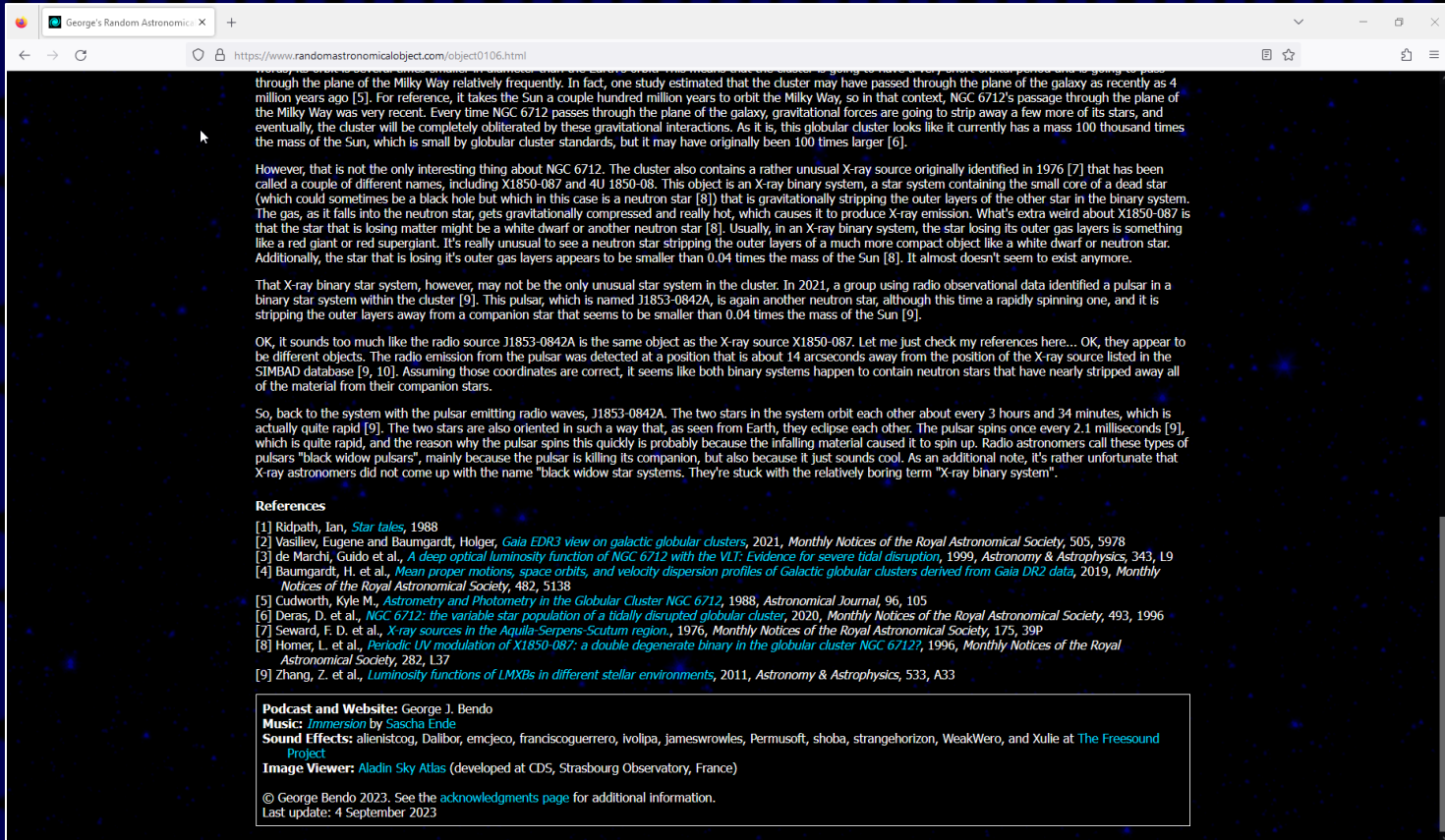


The coordinates for this episode point to a location in another weird and obscure constellation that neither you nor I have ever heard of, which means that, once again, it's time for me to rant about stupid constellations. This time, the stupid constellation is Scutum, the shield, which is another collection of randomly arranged faint stars in the sky. This constellation was invented in 1684 by Polish astronomer Johannes Hevelius, and it was supposed to represent the shield of King John III Sobieski of Poland [1]. Although the Milky Way in this part of the sky is relatively bright, the constellation does not contain any notable bright stars, and, of course, the stars that are present do not look like a shield no matter how big your imagination is.

Anyway, the specific object featured in this episode is the globular cluster NGC 6712. If you ask an astronomer about globular clusters, they will tell you that they are spherical clusters of extremely old stars that orbit outside the plane of the Milky Way. If you don't ask an astronomer about globular clusters, they will still tell you that they are spherical clusters of extremely old stars that orbit outside the plane of the Milky Way. They will follow you around and tell you about things like color-luminosity diagrams and distance measurements using Cepheid variable stars until you find a way to escape.

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through the plane of the Milky Way relatively frequently. In fact, one study estimated that the cluster may have passed through the plane of the galaxy as recently as 4 million years ago [5]. For reference, it takes the Sun a couple hundred million years to orbit the Milky Way, so in that context, NGC 6712's passage through the plane of the Milky Way was very recent. Every time NGC 6712 passes through the plane of the galaxy, gravitational forces are going to strip away a few more of its stars, and eventually, the cluster will be completely obliterated by these gravitational interactions. As it is, this globular cluster looks like it currently has a mass 100 thousand times the mass of the Sun, which is small by globular cluster standards, but it may have originally been 100 times larger [6].

However, that is not the only interesting thing about NGC 6712. The cluster also contains a rather unusual X-ray source originally identified in 1976 [7] that has been called a couple of different names, including X1850-087 and 4U 1850-08. This object is an X-ray binary system, a star system containing the small core of a dead star (which could sometimes be a black hole but which in this case is a neutron star [8]) that is gravitationally stripping the outer layers of the other star in the binary system. The gas, as it falls into the neutron star, gets gravitationally compressed and really hot, which causes it to produce X-ray emission. What's extra weird about X1850-087 is that the star that is losing matter might be a white dwarf or another neutron star [8]. Usually, in an X-ray binary system, the star losing its outer gas layers is something like a red giant or red supergiant. It's really unusual to see a neutron star stripping the outer layers of a much more compact object like a white dwarf or neutron star. Additionally, the star that is losing it's outer gas layers appears to be smaller than 0.04 times the mass of the Sun [8]. It almost doesn't seem to exist anymore.

That X-ray binary star system, however, may not be the only unusual star system in the cluster. In 2021, a group using radio observational data identified a pulsar in a binary star system within the cluster [9]. This pulsar, which is named J1853-0842A, is again another neutron star, although this time a rapidly spinning one, and it is stripping the outer layers away from a companion star that seems to be smaller than 0.04 times the mass of the Sun [9].

OK, it sounds too much like the radio source J1853-0842A is the same object as the X-ray source X1850-087. Let me just check my references here... OK, they appear to be different objects. The radio emission from the pulsar was detected at a position that is about 14 arcseconds away from the position of the X-ray source listed in the SIMBAD database [9, 10]. Assuming those coordinates are correct, it seems like both binary systems happen to contain neutron stars that have nearly stripped away all of the material from their companion stars.

So, back to the system with the pulsar emitting radio waves, J1853-0842A. The two stars in the system orbit each other about every 3 hours and 34 minutes, which is actually quite rapid [9]. The two stars are also oriented in such a way that, as seen from Earth, they eclipse each other. The pulsar spins once every 2.1 milliseconds [9], which is quite rapid, and the reason why the pulsar spins this quickly is probably because the infalling material caused it to spin up. Radio astronomers call these types of pulsars "black widow pulsars", mainly because the pulsar is killing its companion, but also because it just sounds cool. As an additional note, it's rather unfortunate that X-ray astronomers did not come up with the name "black widow star systems. They're stuck with the relatively boring term "X-ray binary system".

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Podcast and Website: George J. Bendo
Music: *Immersion* by Sascha Ende
Sound Effects: alienistcog, Dalibor, emcjeco, franciscoguerrero, ivolipa, jameswrowles, Permusoft, shoba, strangehorizon, WeakWero, and Xulle at The Freesound Project
Image Viewer: Aladin Sky Atlas (developed at CDS, Strasbourg Observatory, France)

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The webpages could also include other pages, such as biographies and information not put into the podcasts themselves (especially images and references).

Very importantly, the mp3 files themselves should be placed on the website.

Also, very importantly, the podcast needs an RSS feed. This is a special type of xml file with information about the podcast that is read by podcast distribution websites (Spotify, Apple Podcasts, etc.).

The top part of the RSS file (which could be named `rss.xml` for simplicity) should have an `rss` tag (specifying the type of RSS feed) and a `channel` tag that should contain the following tags:

- `title` – Podcast title.
- `link` – Link to the podcast.
- `image` – Image for the podcast.
- `itunes:image` – Image for the podcast.
- `copyright` – Copyright statement.
- `description` – General description of the podcast.
- `itunes:subtitle` – Short general description of the podcast.
- `itunes:summary` – General description of the podcast.
- `itunes:owner` – Podcast creator.
- `language` – Language of the podcast.

The top part of the RSS file (which could be named rss.xml for simplicity) should have an rss tag (specifying the type of RSS feed) and a channel tag that should contain the following tags:

- pubDate – Last date when the podcast was published.
- lastBuildDate – Last date when the RSS file was created.
- itunes:explicit – Boolean (True/False) to indicate whether the podcast contains explicit content.
- itunes:category – Subject category.
- itunes:keywords – Keywords that describe the podcast.
- itunes:type – Indicator for how the episodes should be listed (episodic/serial).
- atom – Tag for Atom web standard.

```
<rss xmlns:itunes="http://www.itunes.com/dtds/podcast-1.0.dtd" xmlns:podcast="https://podcastindex.org/namespace/1.0" xmlns:atom="http://www.w3.org/2005/Atom" xmlns:content="http://purl.org/rss/1.0/modules/content/" version="2.0">
  <channel>
    <title>George's Random Astronomical Object</title>
    <link>https://www.randomastronomicalobject.com/</link>
    <image>
      <url>https://www.randomastronomicalobject.com/podcast-icon.jpg</url>
      <title>George's Random Astronomical Object</title>
      <link>https://www.randomastronomicalobject.com/</link>
    </image>
    <copyright>George Bendo copyright 2019-2023</copyright>
    <description>George's Random Astronomical Object is a biweekly astronomy podcast featuring science discussions about astronomical objects at randomly selected locations in the sky. The wide range of topics discussed in the show include stars, variable stars, variable variable stars, supermassive black holes, ultracool dwarf stars, exoplanets, howler monkeys, infrared radiation, acronyms, more acronyms, starbursts, measurements of less than 20 parsecs, jellyfish galaxies, diffuse ionized gas, and general overall weirdness.</description>
    <language>en</language>
    <pubDate>04 Sep 2023 09:56:07 GMT</pubDate>
    <lastBuildDate>04 Sep 2023 09:56:07 GMT</lastBuildDate>
    <itunes:subtitle>George's Random Astronomical Object is a biweekly astronomy podcast featuring science discussions about astronomical objects at randomly selected locations in the sky. </itunes:subtitle>
    <itunes:author>George Bendo</itunes:author>
```

```
<itunes:summary>George's Random Astronomical Object is a biweekly astronomy
podcast featuring science discussions about astronomical objects at randomly selected
locations in the sky. The wide range of topics discussed in the show include stars,
variable stars, variable variable stars, supermassive black holes, ultracool dwarf
stars, exoplanets, howler monkeys, infrared radiation, acronyms, more acronyms,
starbursts, measurements of less than 20 parsecs, jellyfish galaxies, diffuse ionized
gas, and general overall weirdness.</itunes:summary>
```

```
<itunes:owner>
```

```
<itunes:name>George Bendo</itunes:name>
```

```
<itunes:email>rss-contact@randomastronomicalobject.com</itunes:email>
```

```
</itunes:owner>
```

```
<itunes:explicit>False</itunes:explicit>
```

```
<itunes:image href="https://www.randomastronomicalobject.com/podcast-icon.jpg"/>
```

```
<itunes:category text="Science">
```

```
<itunes:category text="Astronomy"/>
```

```
<itunes:category text="Natural Sciences"/>
```

```
</itunes:category>
```

```
<itunes:type>episodic</itunes:type>
```

```
<itunes:keywords>astronomy,space,science,random</itunes:keywords>
```

```
<atom10:link xmlns:atom10="http://www.w3.org/2005/Atom" rel="self"
```

```
href="https://www.randomastronomicalobject.com/rss.xml" type="application/rss+xml"/>
```

Each episode in the podcast will have its own entry in the RSS file. Those entries should include the following tags:

- title – Episode title
- itunes:title – Episode title
- itunes:subtitle – Episode subtitle
- itunes:author – Episode creator
- description – Short description of the episode.
- itunes:summary – Short description of the episode.
- enclosure – Link to the mp3 file.
- guid – Identifier for the episode.
- link – Link to a webpage for the episode.
- pubDate – Publication date.
- itunes:duration – Episode length.
- itunes:explicit – Boolean (True/False) to indicate whether the episode contains explicit content

The end of the episode list should include `</channel>` and `</rss>`.

```
<item>
  <title>Object 106: A Tale of Two Binary Star Systems</title>
  <itunes:title>A Tale of Two Binary Star Systems</itunes:title>
  <itunes:author>George Bendo</itunes:author>
  <description>While some astronomers are interested the globular cluster NGC
6712 because it appears to have been severely tidally disrupted by orbiting too close
to the center of the Milky Way, other astronomers are interested in the cluster
because it contains a couple of weird yet similar binary star systems.</description>
  <itunes:subtitle>NGC 6712</itunes:subtitle>
  <itunes:summary>While some astronomers are interested the globular cluster NGC
6712 because it appears to have been severely tidally disrupted by orbiting too close
to the center of the Milky Way, other astronomers are interested in the cluster
because it contains a couple of weird yet similar binary star
systems.</itunes:summary>

<enclosure url="https://www.randomastronomicalobject.com/object0106.mp3" type="audio/
mpeg"
length="29294000"/>
  <guid>https://www.randomastronomicalobject.com/object0106.mp3</guid>
  <link>https://www.randomastronomicalobject.com/object0106.html</link>
  <pubDate>04 Sep 2023 12:00:00 GMT</pubDate>
  <itunes:duration>12:09</itunes:duration>
  <itunes:explicit>>false</itunes:explicit>
</item>
```

The RSS file itself can be validated using one or more of the following websites:

- Cast Feed Validator (www.castfeedvalidator.com)
- Podbase – Podcast Validator (podba.se/validate/)
- W3C Feed Validation Service (validator.w3.org/feed/)

See also <https://www.randomastronomicalobject.com/rss.xml> for an example RSS feed.

Distribution

Once the podcast has been set up, it needs to be distributed to the websites and apps where people listen to podcasts (although some people may want to just listen to episodes from your website).

The largest podcast distributors at this point in time are:



Amazon Music



Apple Podcasts



Google Podcasts



Simplecast



Spotify



YouTube

However, many other podcast distribution apps/websites exist:

- AntennaPod
- Anytime Player
- Bullhorn
- Castamatic
- Castbox
- Castro
- CurioCaster
- Fountain
- Goodpods
- Luminary
- Moon FM
- Overcast
- Player FM
- Pocket Casts
- Podbean
- Podcast Addict
- Podcast Index
- Podcast Guru
- Podcast Republic
- Podchaser
- Podfriends
- podStation
- Podverse
- Podvine
- Sonnet
- Steno.fm
- TuneIn
- Vurbl

To distribute a new podcast, you need the RSS feed set up and at least one episode online. At this point, you should go to at least the podcast distribution websites below and submit your RSS feed:



Amazon Music



Apple Podcasts



Simplecast



Spotify

(These distributors will distribute podcasts for free.)

After a few days, the podcast should be approved and should appear in these apps/websites.

After a few more days, other apps may copy the podcast listings from one of the larger distribution apps/websites and will list your podcast.

Google Podcasts specifically uses a webcrawler that will find your podcast and automatically list it.

If you find other podcast websites that do not list your podcast, you can always try submitting it.

When you publish a new episode for your podcast, you only need to update the RSS file. The distribution apps and websites will automatically list the new episode (although it may take an hour or so).

It is worthwhile to frequently check your podcast on various distribution websites, especially the major ones, just to make sure that the podcast and episodes are displayed properly.

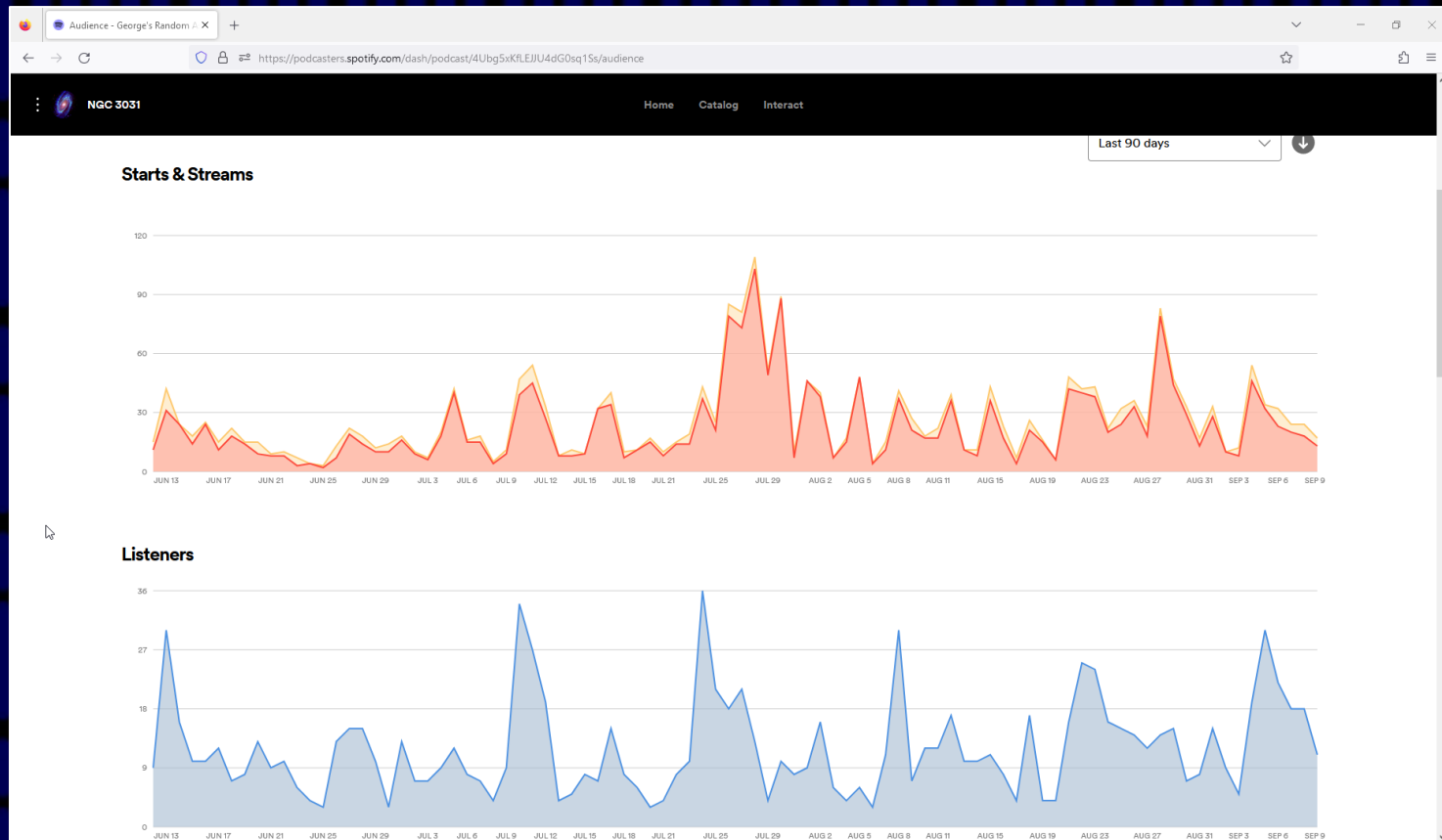
(Some of the less popular websites may not function well and may show out-of-date information.)

Many distribution websites include analytical information that podcasters can use to see how their podcasts are performing. Spotify has very comprehensive information. Apple Podcasts and Google Podcasts also have good pages.

The screenshot shows the Spotify interface for the podcast 'George's Random Astronomical Object'. The page displays the podcast cover art, the title, and the host 'George Bendo' with 106 episodes. Key performance metrics are shown: 28,594 starts, 22,833 streams, 3,781 listeners, and 1,242 followers. Below these metrics are tabs for Episodes, Audience, Details, and Interact. A search filter and a date range selector (set to 'Last 7 days') are also present. A table lists the top episodes with their status, format, and performance data.

	Status	Format	Starts	Streams	Listeners	Publish Date
Object 106: A Tale of Two Binary Star Systems	Published	Audio	89	75	81	Sep 4, 2023
Object 105: Super-Slow Star Formation	Published	Audio	6	5	6	Aug 21, 2023
Object 104: Going Cross-Country for a Supermassive Black Hole	Published	Audio	6	5	5	Aug 7, 2023
Object 103: The Pulsar within the Cosmic Hand	Published	Audio	1	1	1	Jul 24, 2023

Many distribution websites include analytical information that podcasters can use to see how their podcasts are performing. Spotify has very comprehensive information. Apple Podcasts and Google Podcasts also have good pages.



Publicity

When starting a new podcast, it may have very few listeners. This will change over time.

Eventually, people will find your podcast on their own and will begin listening to it. It is important to keep on producing episodes and to keep on publishing them on time.

However, it is possible to do a few things to improve the visibility of the podcast.

Word-of-mouth is always a useful way to spread information about your podcast, but this might be limited to people you know.

Paying for advertising could lead to a boost in listeners. However, this is not advisable if you have no money.

A couple of unique options for podcasts to get more publicity is to either feature guests (especially from other podcasts) or to do guest episodes on other podcasts.



365 Days of Astronomy is open to guest episodes from various contributors and would be a good place to advertise your new astronomy podcast.

Also, be certain to set up profiles for your podcast on social media (at least Facebook) and to direct people to those profile pages.

