

# EYAL GRUSS

Talpiyot graduate

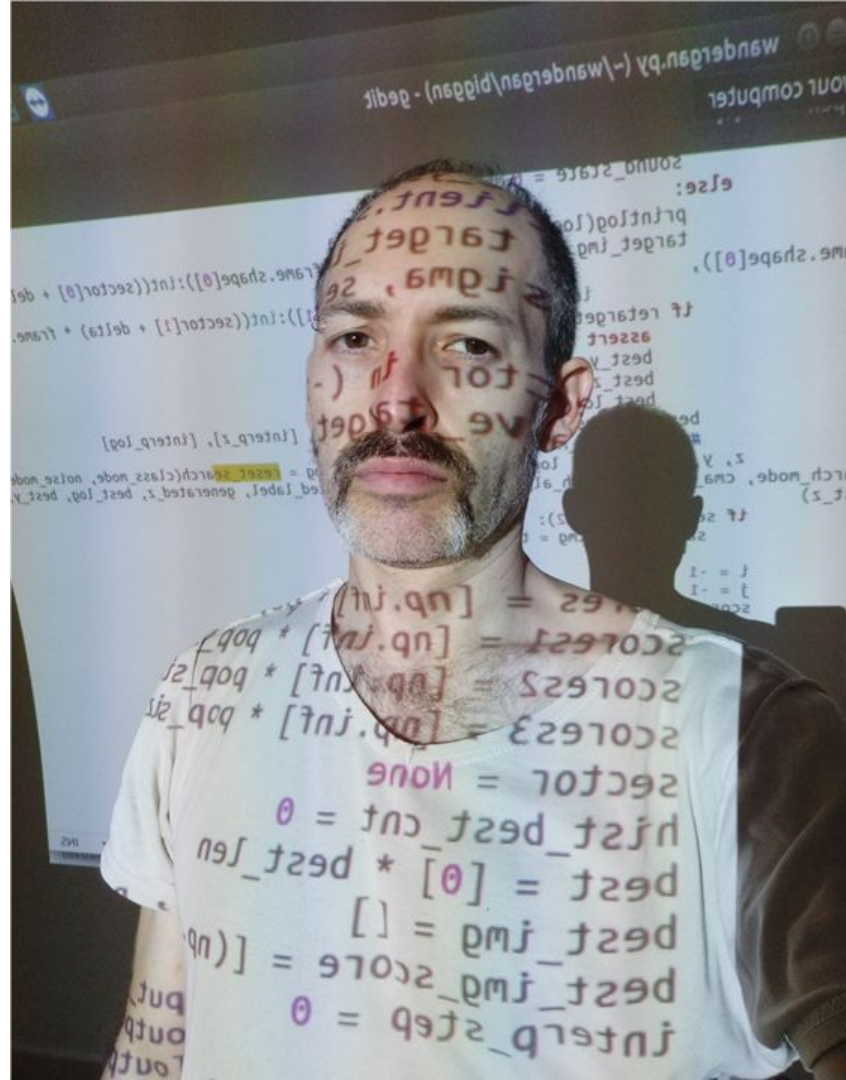
Physics PhD

Code/Media/Text Artist

Machine learning researcher

Teaching computational creativity

[eyalgruss.com](http://eyalgruss.com)



# COMPRESSION IS INTERESTING

**Friend:** Can you help compress a 750 MB  
12-hour white noise audio file?

**Me:** No! This is theoretically impossible,  
and... Yes! This is just one line of code

# COMPRESSION IS INTERESTING

**Friend:** Can you put 1000 haikus in  
a stand-alone 25 kB HTML?

**Me:** Yes! Here are the next 6 months of my life

**RS:** Can you compress that to a 5 minute talk?

# 1000 HAIKUS IN A 25 kB HTML?

I walk in the streets\n  
Feel a cold northern breeze play\n  
Fills me with delight\n\n

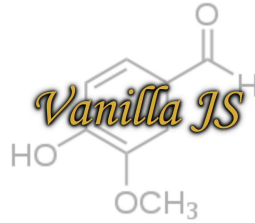
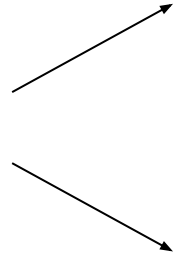


$$1000 \times 77 \text{ B} = 75 \text{ kB}$$

# 1000 HAIKUS IN A 25 kB HTML?



Art Blocks



Everything in 1  
stand-alone JS



On-chain storage  
1 kB ~ 100 USD

# TEXT DOMAIN

$\backslash r \backslash n \rightarrow \backslash n$

$I \rightarrow i$

$\_t h e\_ \rightarrow \_ \_$

$q u \rightarrow q$

# ENTROPY CODING

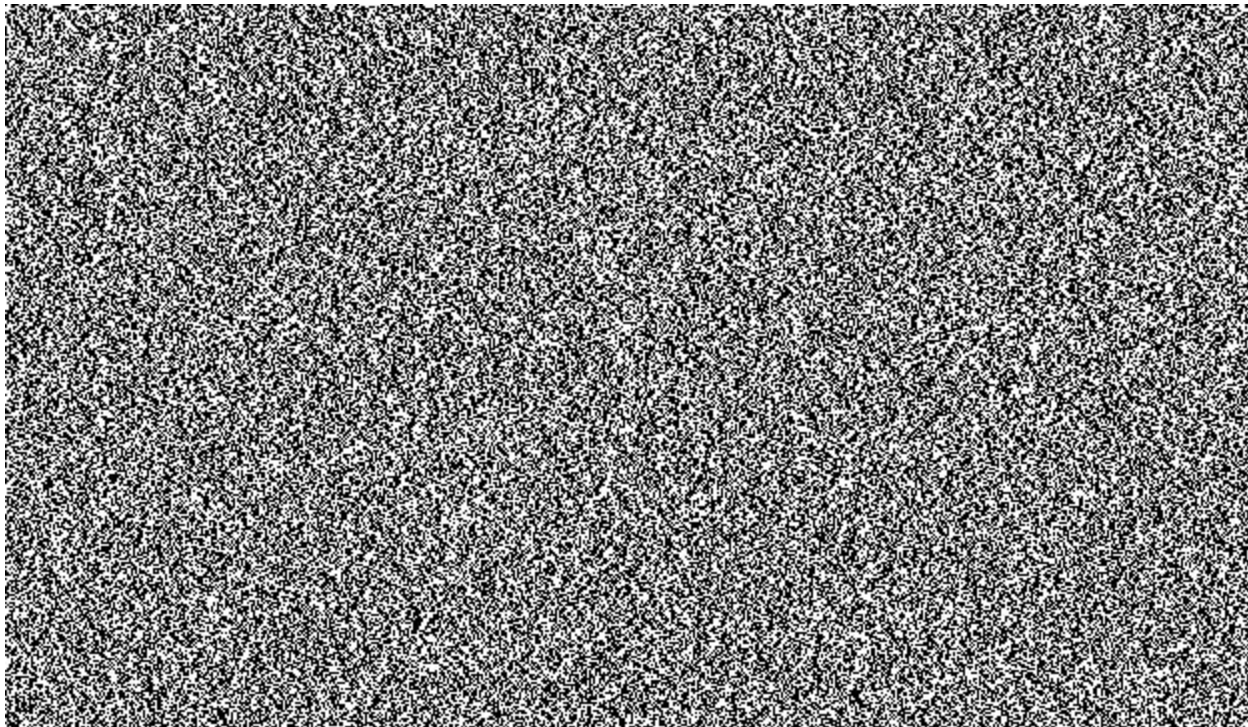
\_ → 000

e → 001

c → 111000

z → 1111111111

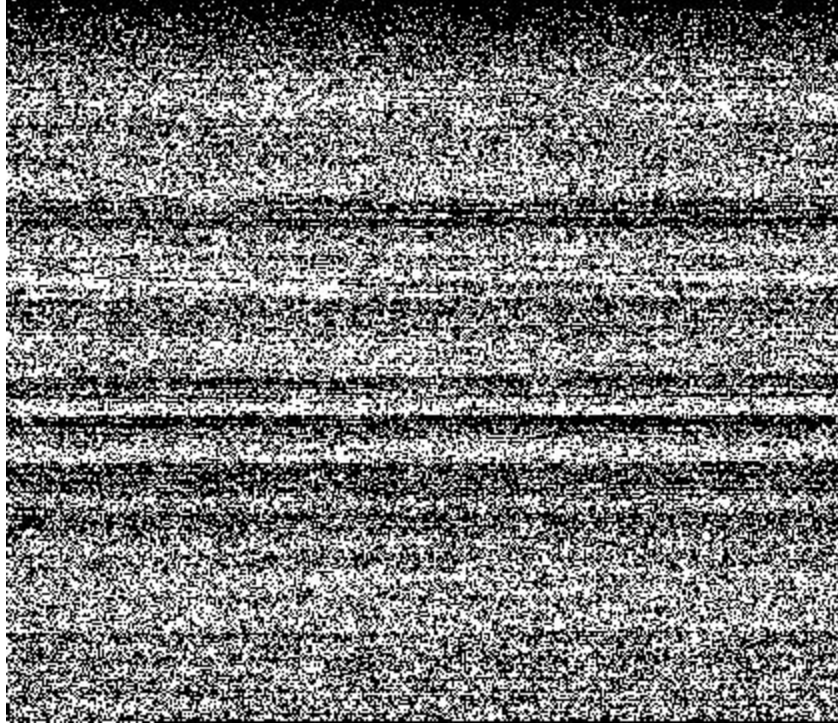
# PNG BOOTSTRAP



Yup,  
1000  
haikus



# GLOBAL TRANSFORMATIONS



Same

1000


haikus

much more  
compressible



# BINARY TO TEXT

## Base64

 ``

33.3% overhead

# BINARY TO TEXT

## Base128-ish



# BINARY TO TEXT

## yEncode?

N<sub>U</sub> S<sub>L</sub> S<sub>O</sub> S<sub>H</sub> S<sub>T</sub> S<sub>X</sub> E<sub>T</sub> E<sub>X</sub> E<sub>O</sub> E<sub>T</sub> E<sub>N</sub> A<sub>C</sub> A<sub>K</sub> B<sub>E</sub> B<sub>L</sub> B<sub>S</sub> H<sub>T</sub> L<sub>V</sub> F<sub>T</sub> F<sub>C</sub> R<sub>S</sub> S<sub>S</sub> D<sub>L</sub> D<sub>F</sub> D<sub>C</sub> D<sub>C</sub> D<sub>C</sub> N<sub>A</sub> S<sub>Y</sub> E<sub>C</sub> A<sub>N</sub> E<sub>M</sub> S<sub>U</sub> E<sub>S</sub> F<sub>S</sub> G<sub>S</sub> R<sub>S</sub> U<sub>S</sub>

!"#\$%&'()\*+,-./0123456789:;<=>?  
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^\_  
`abcdefghijklmnopqrstuvwxyz{|}~  
€ ¢ , f „ „ „ † ‡ ^ % Š < € Ž · · ' ' " " • — ~ ™ Š > œ · Ž Ÿ  
ı ç £ ¤ ¥ ¦ § ¨ © ª « ¬ ® ¯ ° ± ² ³ ´ µ ¶ · ¸ ¹ º » ¼ ½ ¾ ¿  
À Á Â Ã Ä Å Æ Ç È É Ê Ë Ì Í Î Ï Ð Ñ Ò Ó Ô Õ Ö × Ø Ù Ú Û Ü Ý Þ ß  
à á â ã ä å æ ç è é ê ë ì í î ï ð ñ ò ó ô õ ö ÷ ø ù ú û ü ý þ ÿ

Only encode **CR**

~~UTF-8~~

**CP-1252**

1.2% overhead

# BENCHMARK

	Micromegas (En)	War and Peace (En)
Project Gutenberg .txt	63.7 kB	3.2 MB
7-Zip (max settings)	20.8 kB (32%)	746 kB (23%)
7-Zip (self-extract)	232 kB (364%)	958 kB (29%)
<b>ZTML Base125</b> (UTF-8)	26.5 kB (42%)	916 kB (28%)
<b>ZTML crEnc</b> (CP-1252)	23.6 kB (37%)	818 kB (25%)

# NOT ONLY TEXT

- Efficient inline image encoding (~~Base64~~)
- Eternal websites on the blockchain

e.g. **WEBZOS** [wbtz.github.io](https://wbtz.github.io)

# COMPRESSION IS INTERESTING

Generative Art

Kolmogorov  
Complexity

Code Golf

Demoscene

Web3



# ZTML - EXTREME INLINE TEXT COMPRESSION FOR HTML / JS

[github.com/eyaler/ztml](https://github.com/eyaler/ztml)

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