

# TikZ based macros to simplify the creation of scientific illustrations

Susanne Raab

5. April 2018

Dante Frühjahrstagung Passau



H.E.S.S.



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# What is the Cherenkov effect?



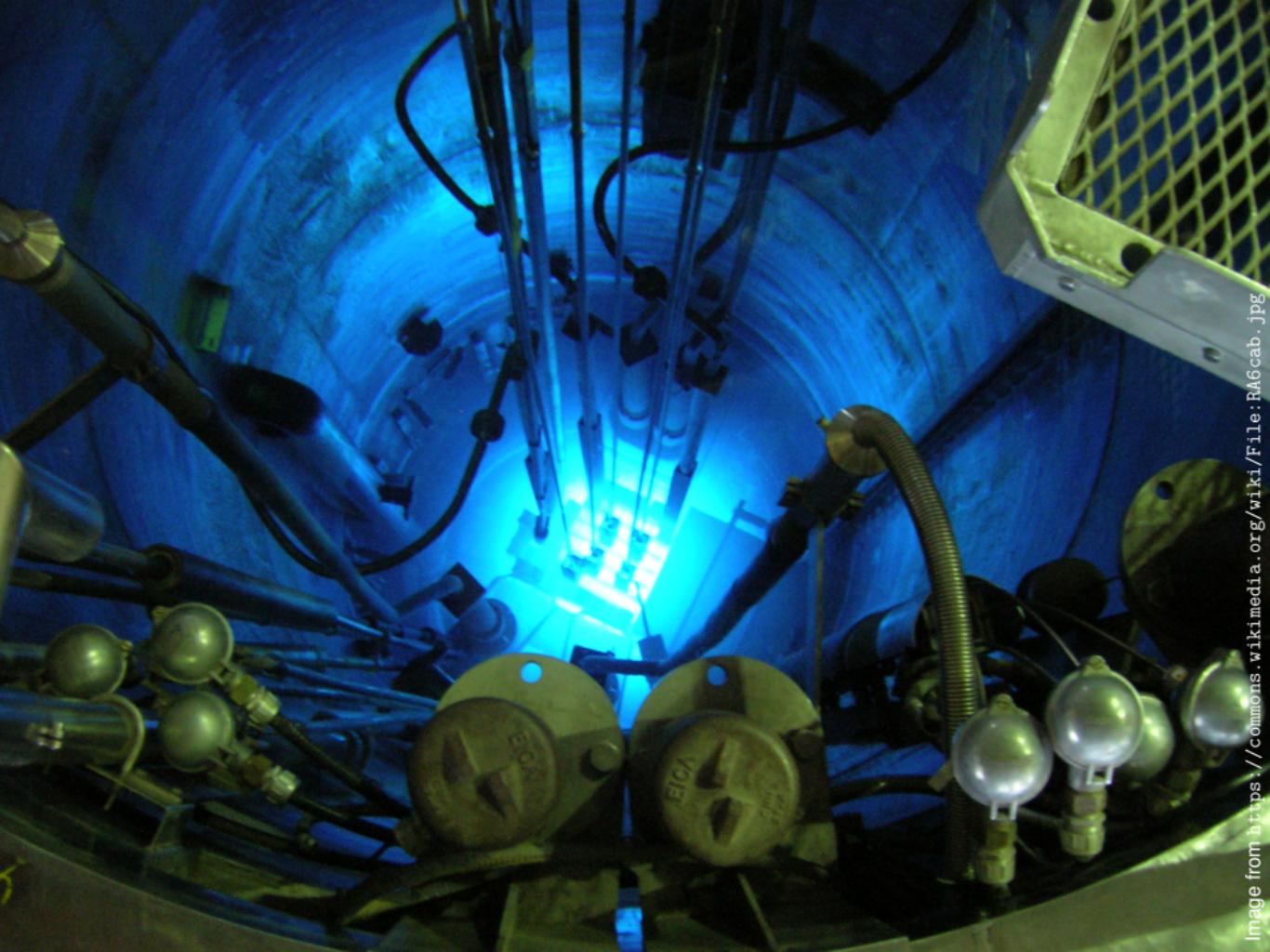
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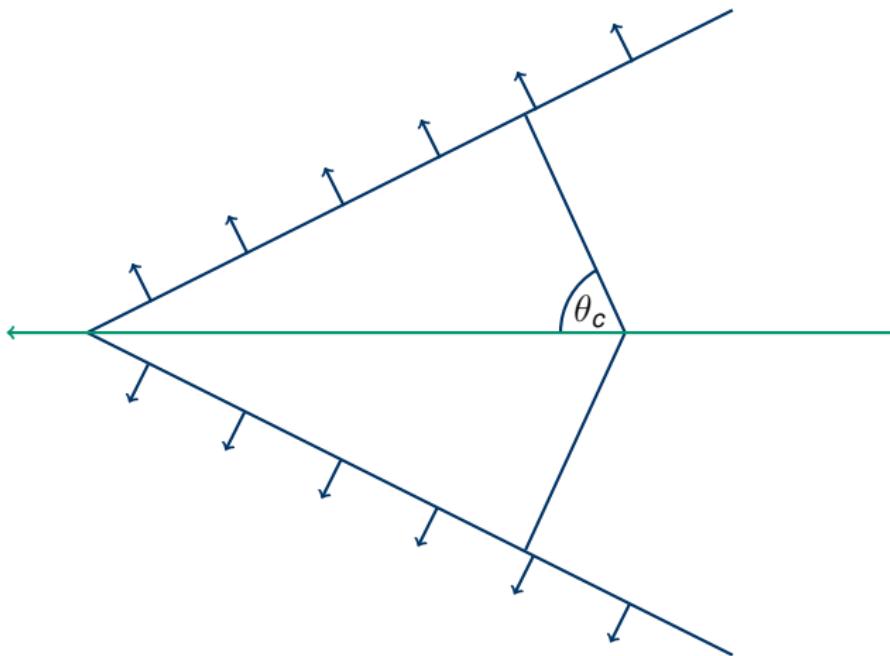
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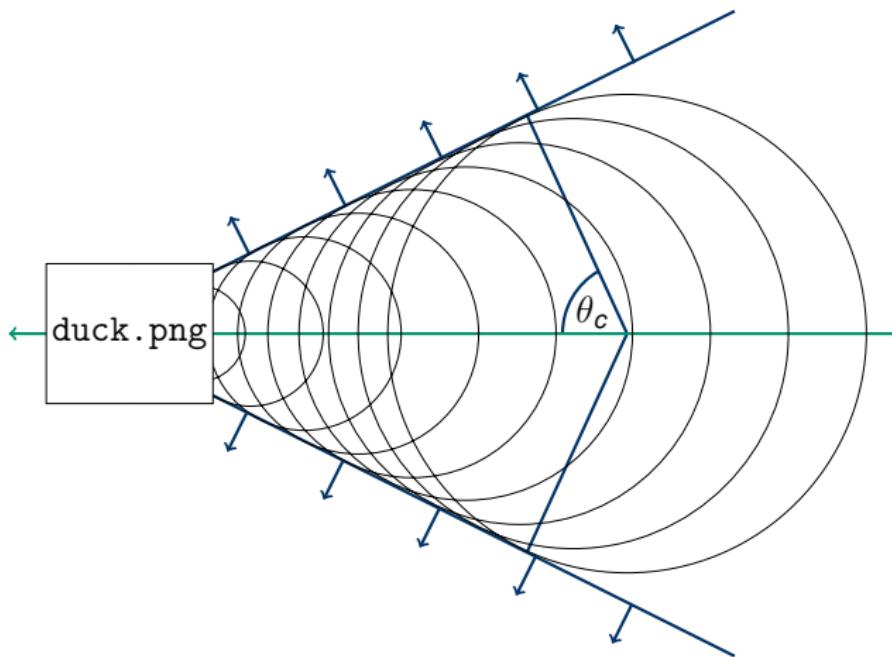
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## Opening angle of the Cherenkov cone



## Opening angle of the Cherenkov cone



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## How can we draw a duck (in order to create a tikzducks package and store it in CTAN)?



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**This question led to a new package:**[tikzducks](#)

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We have a `scsnowman` package but we don't have a `ducks` package, that's quite inexplicable since ducks are frequently used on TeX.SE (e.g., samcarter had to fall back on \PHdove of phaistos package [here](#)).

I'm not an expert, nevertheless, I'd like to create a `tikzducks` package, similar to `tikzpeople`, but I need your help in order to create a customizable duck!

### Requirements:

- I'd like to have a `duck`, not something a bit like it (ducks with a human body are NOT accepted)
- wings are mandatory
- from the look of the duck, it should appear clearly that it was created with LaTeX, not with other commercial tools.

### Possible color-keys for the duck:

- body
- head
- wings
- eyes
- beak.

asked 1 year, 2 months ago

viewed 3,938 times

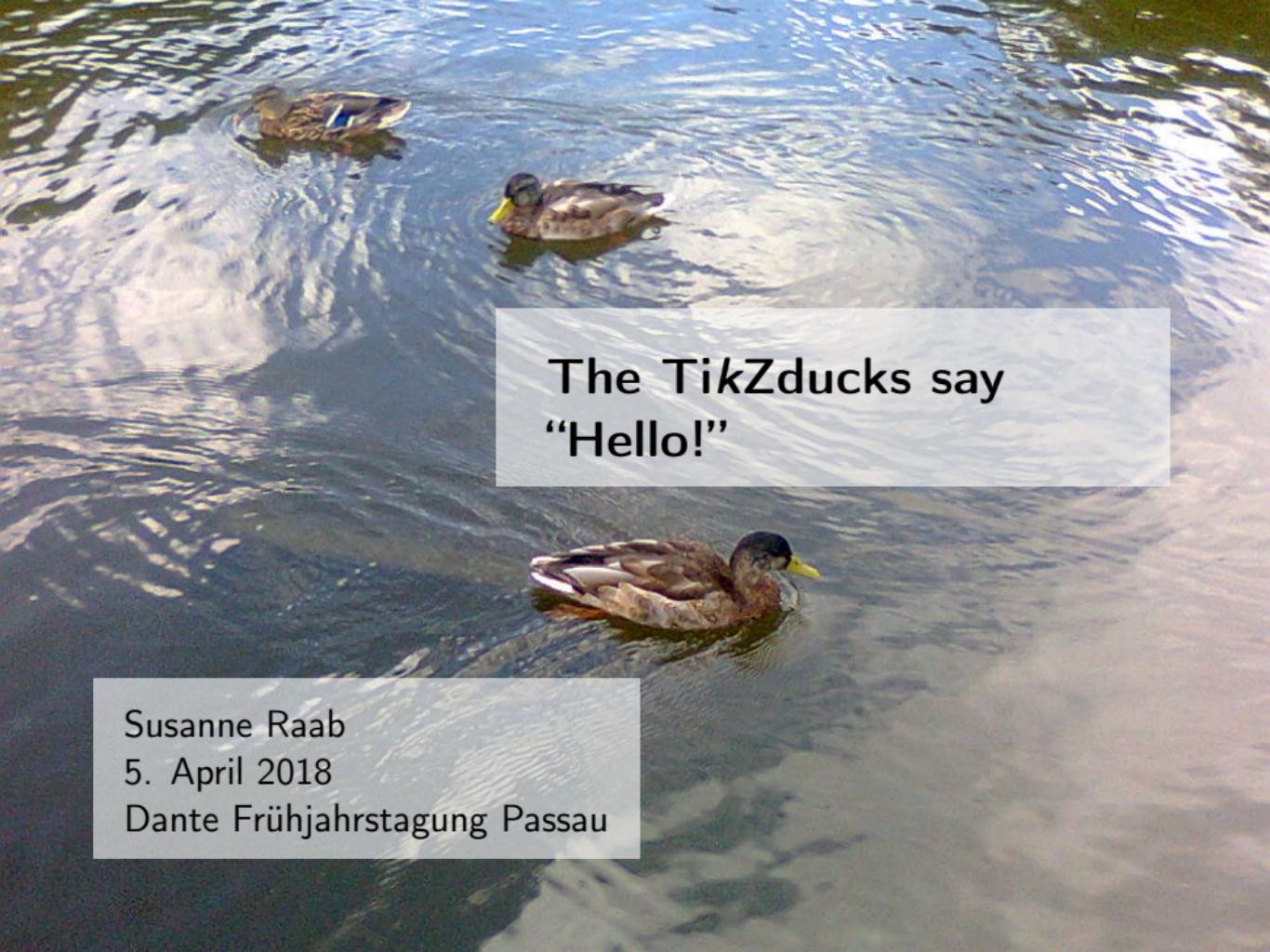
active 5 months ago

### Linked

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A photograph of two ducks swimming in a pond. One duck is in the foreground, facing right, and another is in the background, facing left. The water has ripples and reflections.

The TikZducks say  
“Hello!”

Susanne Raab  
5. April 2018  
Dante Frühjahrstagung Passau





# Introduc(k)tion

# Basic usage

```
\documentclass{standalone}
\usepackage{tikzducks}

\begin{document}

\begin{tikzpicture}
    \duck
\end{tikzpicture}

\end{document}
```

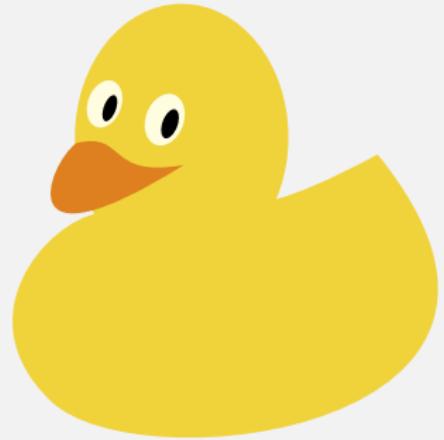
# Basic usage

```
\documentclass{standalone}
\usepackage{tikzducks}

\begin{document}

\begin{tikzpicture}
  \duck
\end{tikzpicture}

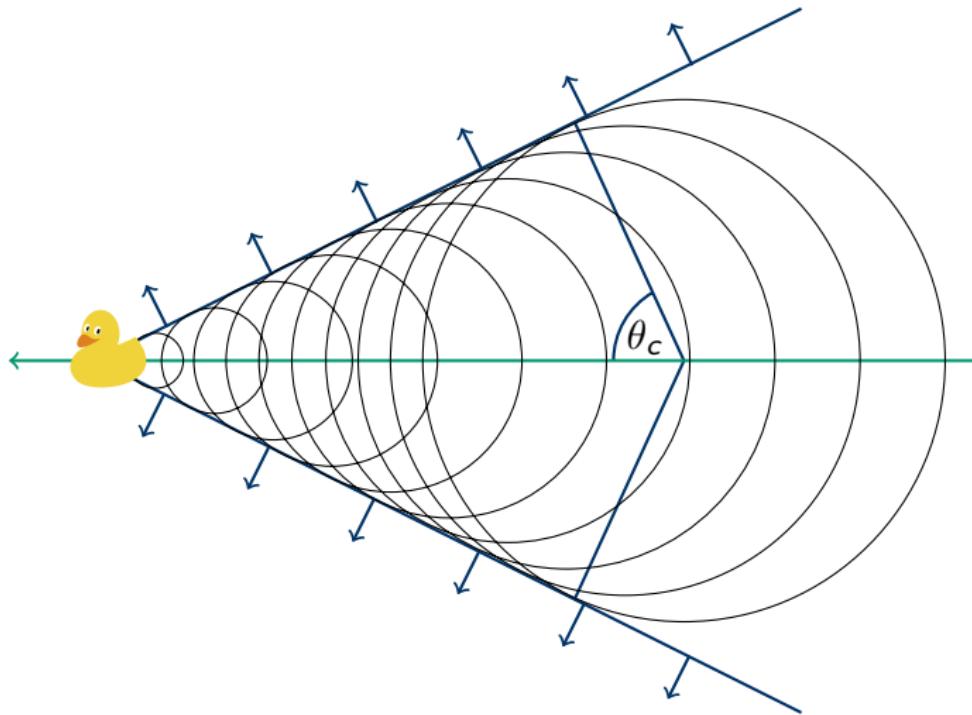
\end{document}
```



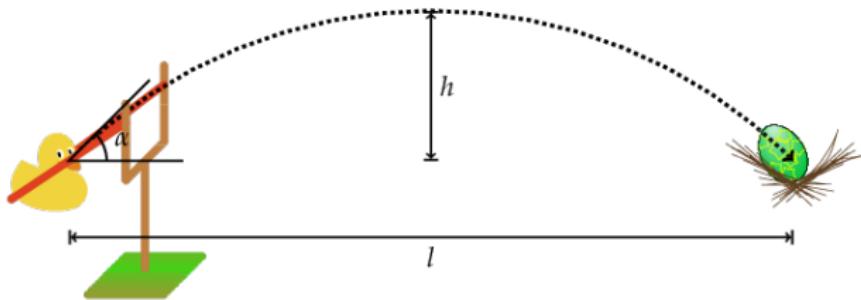


## Usage in scientific illustrations

# Scientific Illustrations I



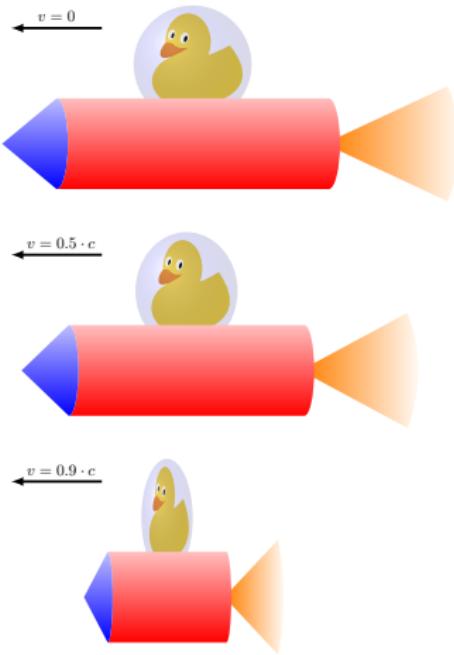
# Scientific illustrations II



Initial speed  $u$  at angle  $\alpha$ , acceleration  $-g$  vertically.

1. Initial velocity  $\mathbf{u} = \left( \begin{array}{c} \dots \\ \dots \end{array} \right)$
2. Vertical velocity  $v_y = \dots$
3. Time to highest point  $t_m = \dots$
4. Vertical position  $y = \dots$
5. Height of highest point  $h = \dots$
6. Time to landing  $t_l = \dots$
7. Horizontal velocity  $v_x = \dots$
8. Horizontal position  $x = \dots$
9. Landing position  $l = \dots$
10. Time in terms of horizontal position  $t = \dots$
11. Vertical position in terms of horizontal position  $y = \dots$

# Scientific illustrations III



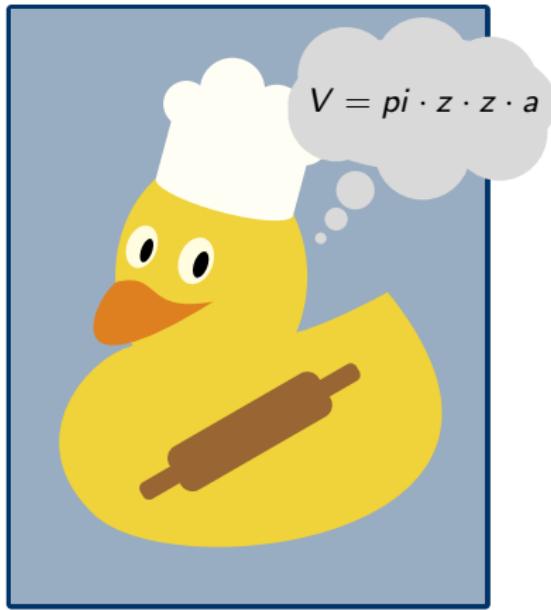
<https://tex.stackexchange.com/a/423010>

# Scientific illustrations IV

What is the formula for the volume of a cylinder with

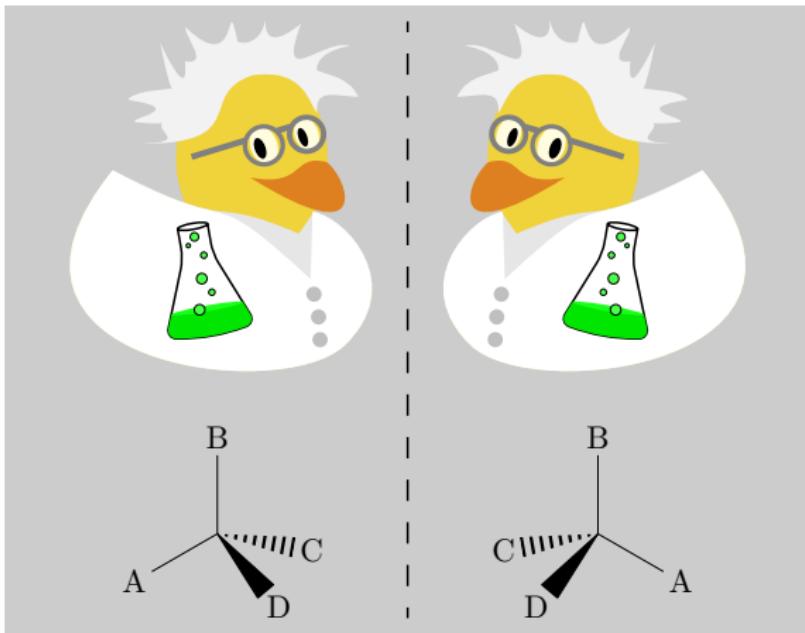
- radius  $z$
- and
- height  $a$

?



<https://tex.stackexchange.com/a/423007>

# Scientific illustrations V



<https://tex.stackexchange.com/a/423094>

# Scientific illustrations VI

**Theorem 1.** For any  $n$ , there is a grammatical English sentence of length  $n$  consisting only of some combination of the words duck and ducks.

Here are the first 6 (with very simplified trees).

(1) Duck!

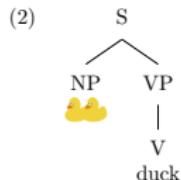
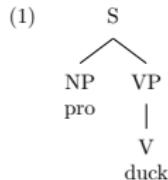
(2) Ducks duck.

(3) Ducks duck ducks.

(4) Ducks ducks duck duck.

(5) Ducks ducks duck duck ducks.

(6) Ducks ducks ducks duck duck duck.



(1) Duck!

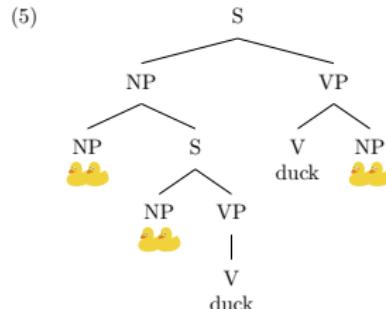
(2) duck.

(3) duck .

(4) duck duck.

(5) duck duck .

(6) duck duck duck.



# Scientific illustrations VII

Many more examples:

[https://tex.stackexchange.com/questions/422989/  
scientific-applications-of-the-tikzducks](https://tex.stackexchange.com/questions/422989/scientific-applications-of-the-tikzducks)



## Customisation

# Key-value-interface

```
\duck[%  
  body=blue,  
  head=green,  
  bill=red,  
  eye=yellow  
]
```



# Predefined addons

```
\duck[tophat]
```



# Predefined addons

```
\duck[tophat]
```



```
\duck[tophat=red]
```



# TikZ Fashion



*Be up-to-duck!*

For an exhaustive list, please see the documentation <http://mirrors.ctan.org/graphics/pgf/contrib/tikzducks/tikzducks-doc.pdf>

# Hair styles



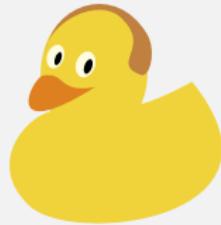
\duck[shorthair]



\duck[longhair]



\duck[crazyhair]



\duck[recedinghair]



\duck[mohican]



\duck[mullet]

# Clothing



```
\duck[tshirt=gray]
```



```
\duck[jacket]
```



```
\duck[cape]
```

```
\duck[  
    tshirt=lightgray,  
    jacket=blue!50!black,  
    tie=blue!80!black,  
    mullet=brown!60!black  
]
```



# Hats



\duck[hat]



\duck[tophat]



\duck[graduate]



\duck[cap]



\duck[beret]



\duck[peakedcap]

# Crowns



```
\duck[crown=gray]
```



```
\duck[queencrown=  
gray]
```



```
\duck[kingcrown]
```

# Glasses



\duck[glasses]



\duck[squareglasses]



\duck[sunglasses]

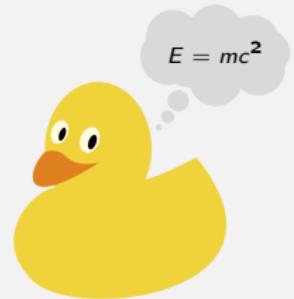
# Messages



```
\duck[  
signpost={Quack!}]
```



```
\duck[  
speech={Quack!}]
```



```
\duck[  
think={$E=mc^2$}]
```

# Sports



\duck[cricket]



\duck[hockey]



\duck[football]

# Sports



\duck[cricket]



\duck[hockey]



\duck[football]

```
\definecolor{mggreen}{RGB}{37,166,89}
\duck[tshirt=mggreen,
      stripes=\stripes,
      football]
```



# Football ducks (by Carla Maggi)

## 1. FC Passau

```
\definecolor{FCPassau}{RGB}{249,34,26}
\duck[tshirt=white,jacket=FCPassau,
      football]
%\node at (wing) {\includegraphics[width
      =0.3cm]{Logo_1fc_passau}};
```



# Football ducks (by Carla Maggi)

## 1. FC Passau

```
\definecolor{FCPassau}{RGB}{249,34,26}
\duck[tshirt=white,jacket=FCPassau,
      football]
%\node at (wing) {\includegraphics[width
      =0.3cm]{Logo_1fc_passau}};
```



## SV Schalding-Heining

```
\definecolor{SV}{RGB}{41,151,66}
\duck[tshirt=white,football,
      stripes={\stripes[color=SV,
      %emblem={\includegraphics[width=0.3cm]{
          Logo_SV-Schalding-Heining2}}}
    ]]
```



# Football ducks (by Carla Maggi)

## Cagliari

```
\duck[tshirt=white, jacket=blue,stripes
      ={\stripes[color=red, width=0.46,
      distance=3]},football]
```



## Sampdoria

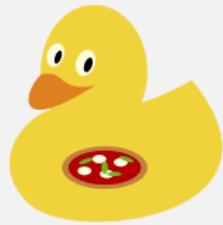
```
\duck[tshirt=blue, jacket=blue,stripes={
\stripes[color=white,rotate=-90,
      width=0.6,distance=1]
\stripes[color=red,rotate=-90,
      width=0.2,distance=1.2]
\stripes[color=black,rotate=-90,width
      =0.1,distance=1.3]},football]
```



# *La Barchetta*



# Food



\duck[pizza]



\duck[icecream]



\duck[milkshake]



\duck[baguette]



\duck[cake]



\duck[wine]

# Random duck generator

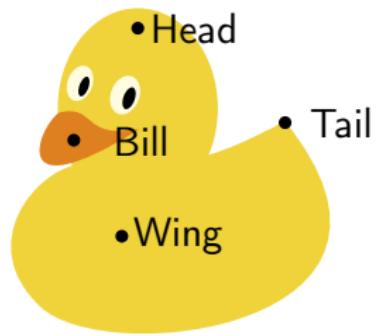
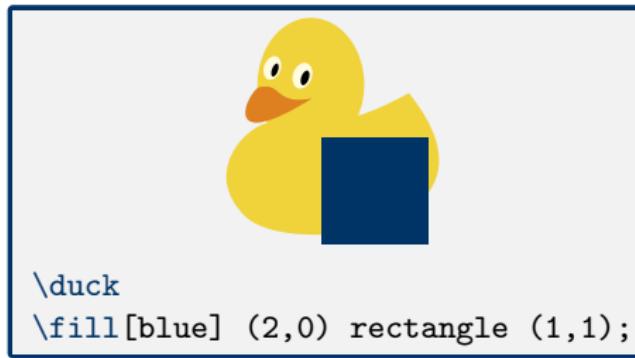
```
\randuck
```



```
\randuck
```



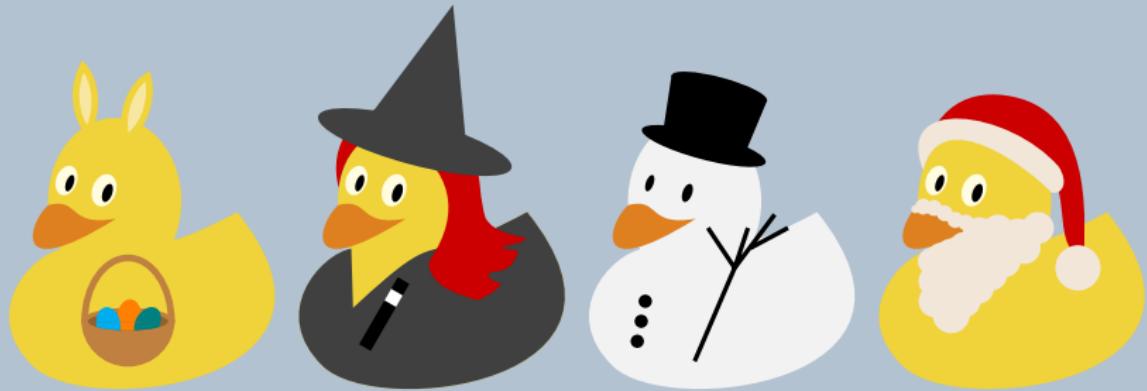
# Unlimited possibilities...





## Examples

# All year round



# Farm animals



# Come to the duck side!



# Live long and prosper!





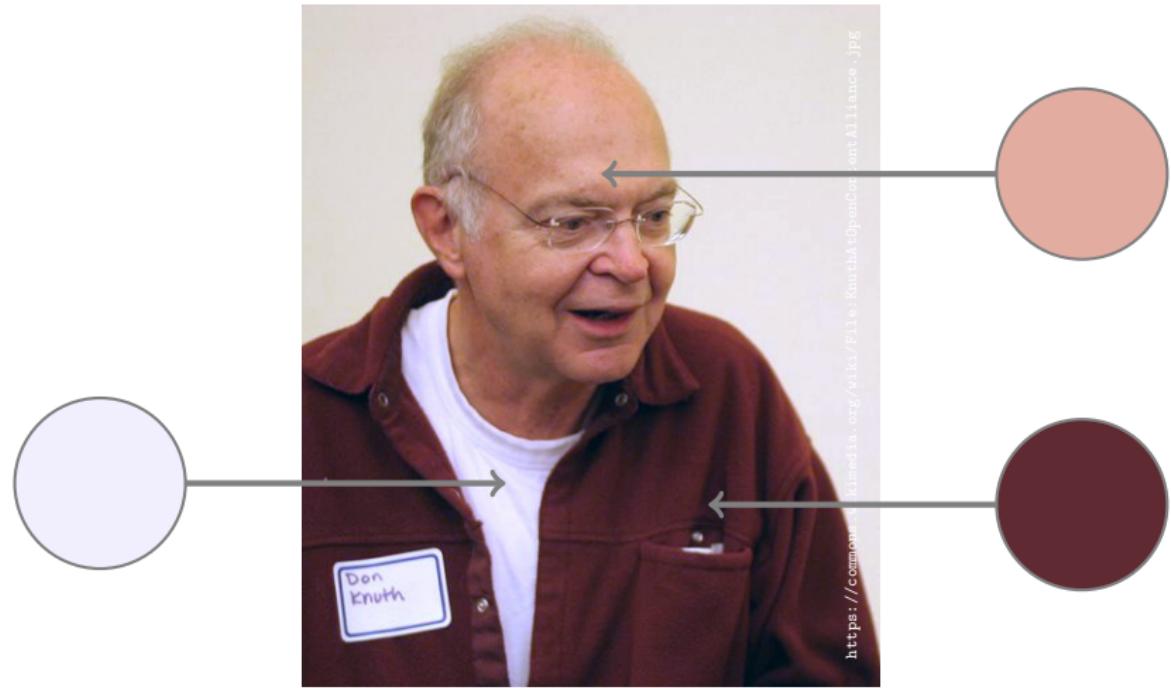
# Duckification

# Duckification

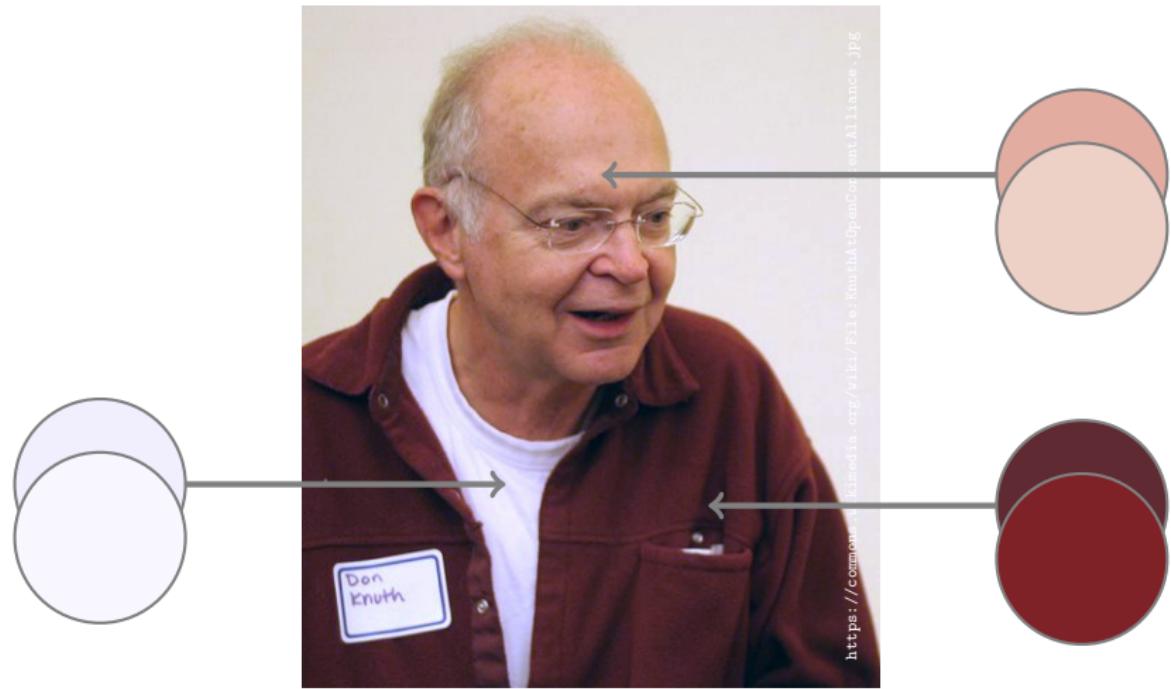


<https://creativecommonsmedia.org/wikis/Foto:DonaldKnuthAtOpenContentAlliance.jpg>

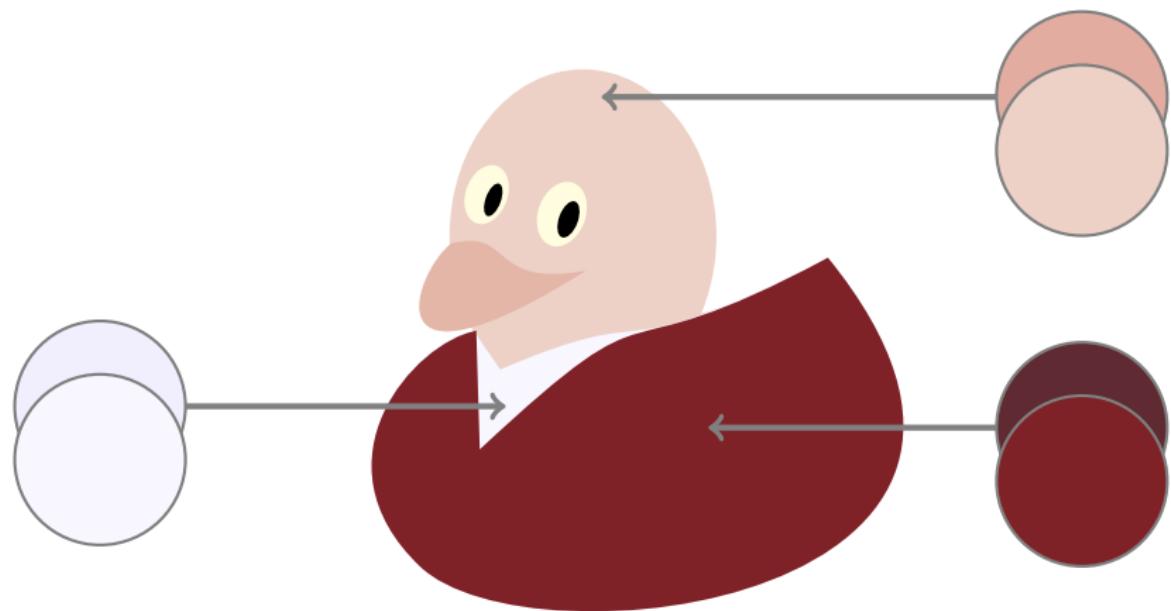
# Duckification



# Duckification



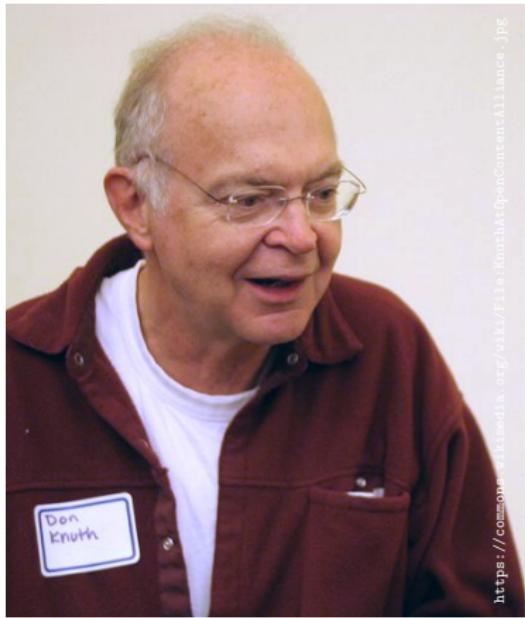
# Duckification



# Duckification



# Duckification



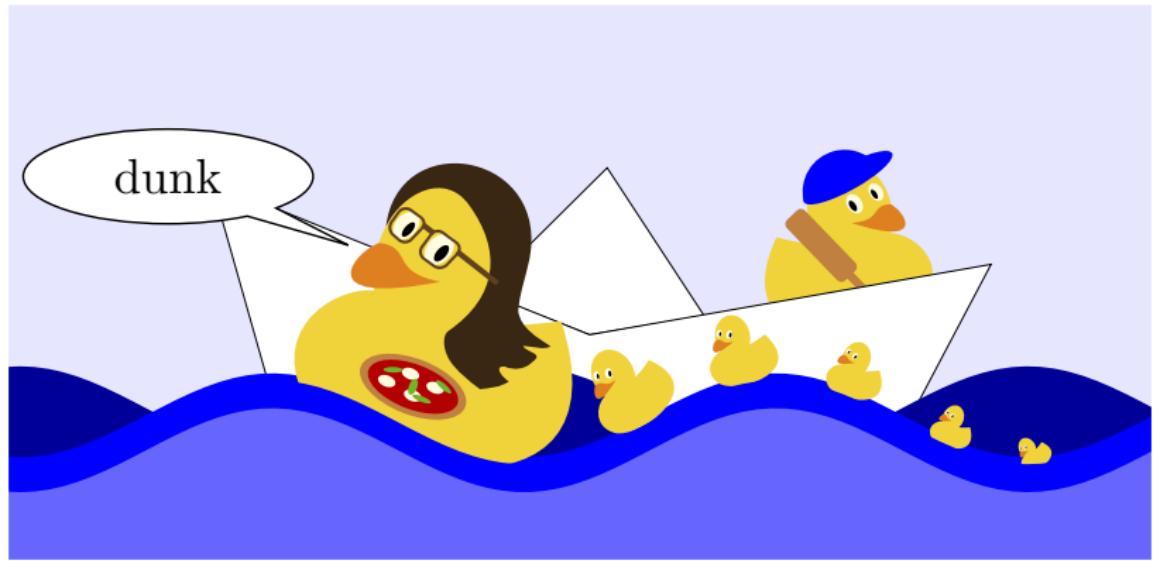


TikZducks users

# Works of art

[https://twitter.com/zr\\_tex8r/status/947836867168178176](https://twitter.com/zr_tex8r/status/947836867168178176)

# Works of art



► <https://tex.stackexchange.com/a/420405>

<https://vimeo.com/246256860>

THE  
GREAT  
TIKZDUCKS  
CHRISTMAS  
EXTRAVAGANZA  
2017



Created to samcarter, creator of tikzducks



# Works of art



<https://chat.stackexchange.com/transcript/message/41637850#41637850>



## Problems & Ideas

# Problems & Ideas

## Where to get the TikZducks?

- Included in T<sub>E</sub>XLive and MiK<sub>T</sub>E<sub>X</sub>
- CTAN: <https://ctan.org/pkg/tikzducks>
- GitHub: <https://github.com/samcarter8/tikzducks>

## Problems?

- Bug tracker: <https://github.com/samcarter8/tikzducks/issues>
- TeX.SE: <https://tex.stackexchange.com/questions/tagged/tikzducks>

## Suggestions?

- Bug tracker also for feature requests
- Contact the author on TeX.Stackexchange

Have fun!

