

# Reproducibility, standards and SOP in bioinformatics

Combined CHARME – EMBnet and NETTAB 2016 Workshop, October 25-26, 2016, Rome, Italy

[Home](#)[Dates](#)[Call](#)[Program](#)[Proceedings](#)[Registration](#)[Committees](#)[Sponsors](#)[Info](#)[NETTAB Workshops](#)

## Education & Training Session



# Reproducibility, standards and SOP in bioinformatics

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[Home](#)

[Dates](#)

[Call](#)

[Program](#)

[Proceedings](#)

[Registration](#)

[Committees](#)

[Sponsors](#)

[Info](#)

[NETTAB Workshops](#)



## The importance of standards

Or, why I like to buy my jeans from the US



# Reproducibility, standards & SOP



# Reproducibility, standards & SOP





# Reproducibility, standards & SOP

- To reach the grail, scientists need education in the use of standards
- This, in turn, demands standards in training
  - hence, need agreed definitions of ‘standards’ & ‘reproducibility’ in training
    - then strategies to implement them
      - then people & resources to make them effective



# Reproducibility, standards & SOP

- So what do we mean by 'standards'?
  - & why do we need them?

# Reproducibility, standards & SOP

- Good 'standards' are intuitive, invisible
  - they make the pieces of our lives fit together more easily



# Reproducibility, standards & SOP

- Good 'standards' are intuitive, invisible
  - they make our lives less frustrating
    - they're deeply annoying when they clash!





# Reproducibility, standards & SOP

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# Reproducibility, standards & SOP

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# Reproducibility, standards & SOP

- Good 'standards' are intuitive, invisible
  - they make things in the environment more comprehensible



# Reproducibility, standards & SOP

- Good 'standards' are intuitive, invisible  
– they make our lives *safer*

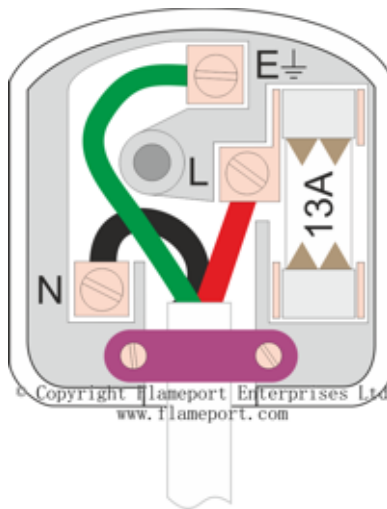


We don't have to unpack a lot of cognitive baggage before we understand the message

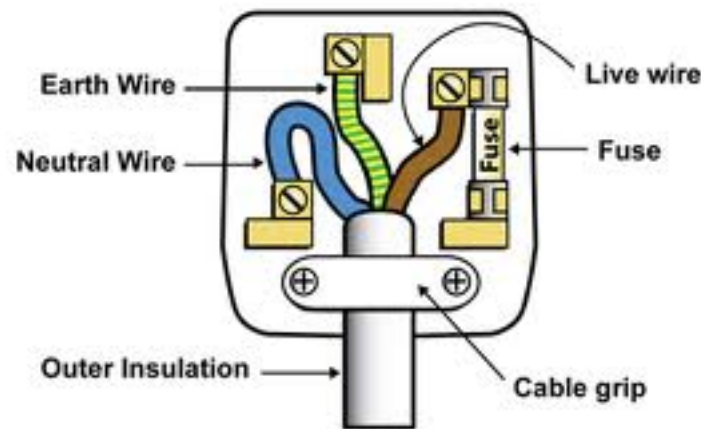


# Reproducibility, standards & SOP

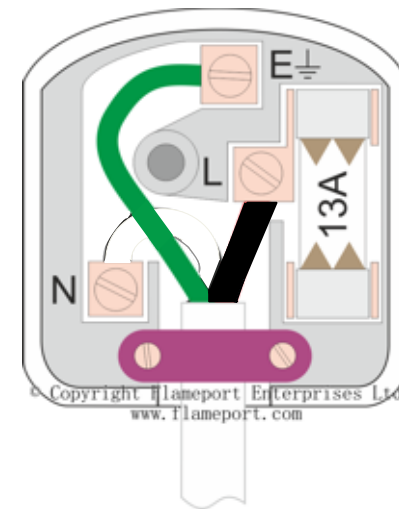
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– they make our lives *safer*



UK wiring pre-1997



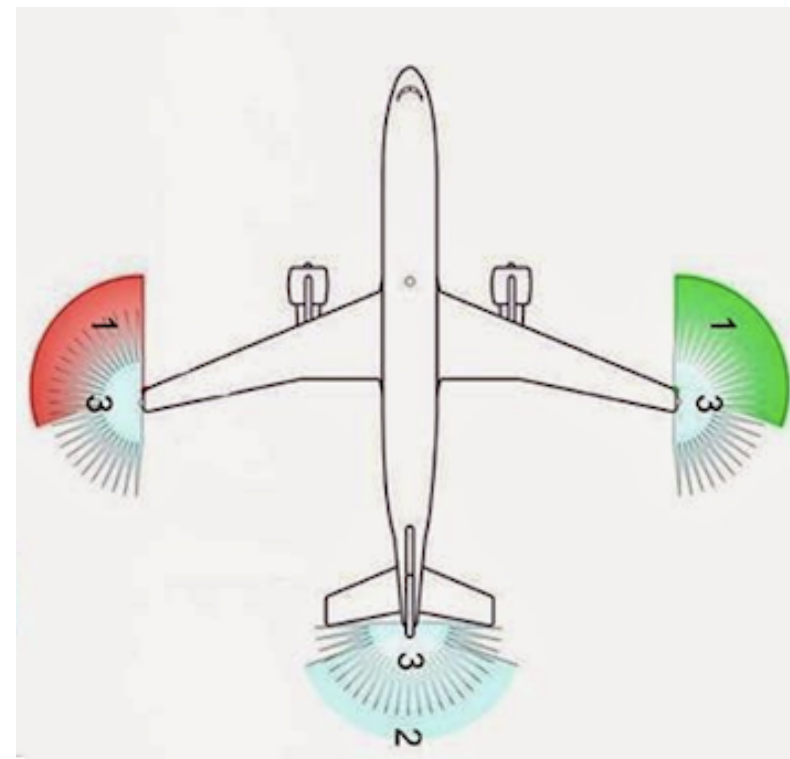
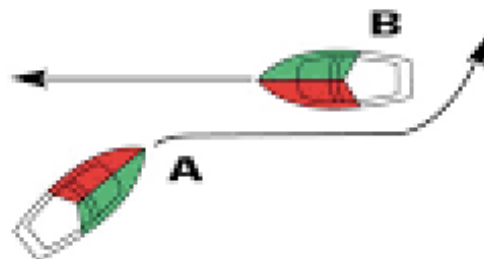
UK wiring



US/Japan wiring

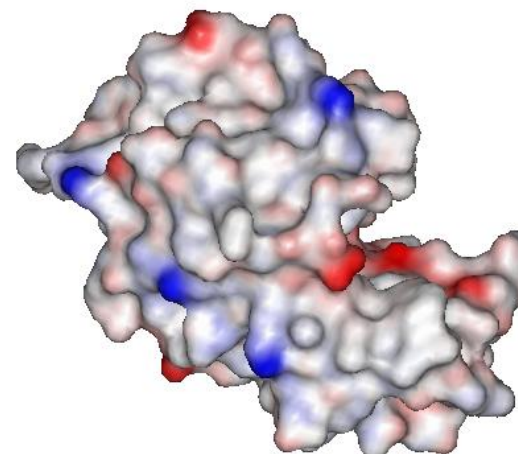
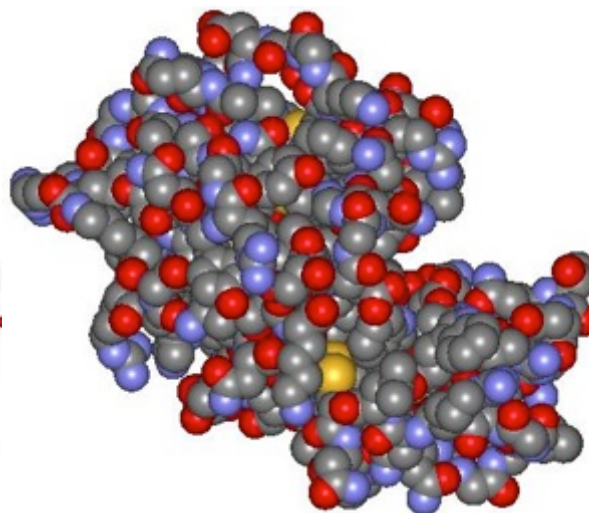
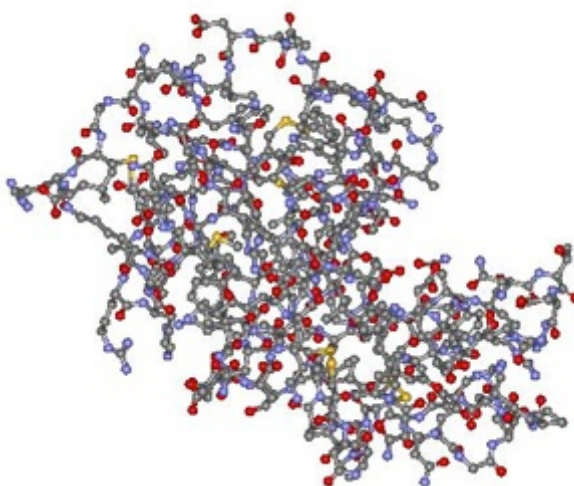
# Reproducibility, standards & SOP

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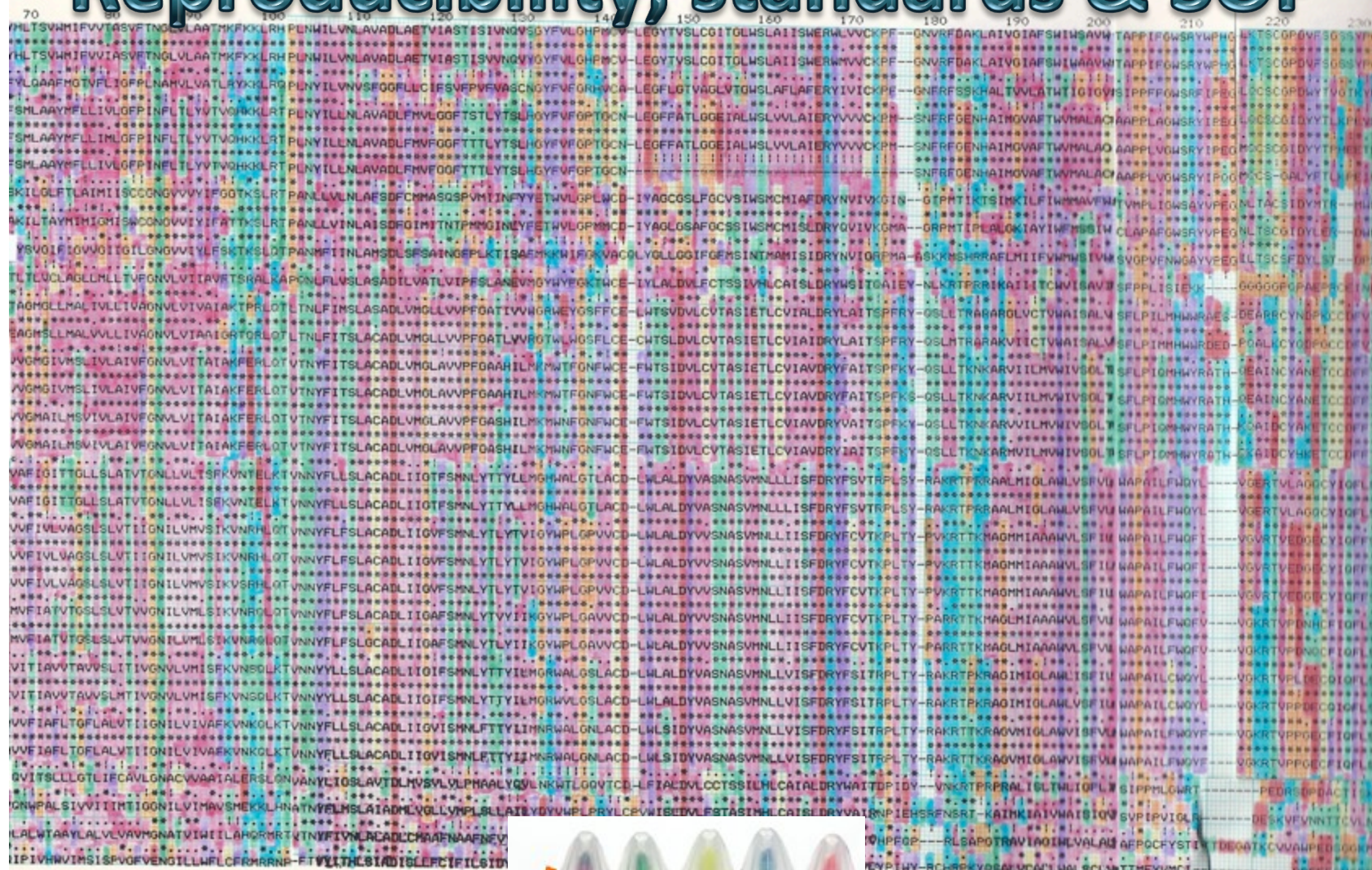
# Reproducibility, standards & SOP

- They're around us in science too
  - important, because they reduce cognitive effort
    - allow us to build meaningful mental models





# Reproducibility, standards & SOP



05/12/2016

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# Reproducibility, standards & SOP

- Then came The Enlightenment

	A	R	N	D	C	Q	E	G	H	I	L	K	M	F	P	S	T	W	Y	V
Clustal	Blue	Red	Green	Purple	Pink	Green	Purple	Orange	Teal	Blue	Blue	Red	Blue	Blue	Yellow	Green	Green	Blue	Teal	Blue
Zappo	Pink	Blue	Green	Red	Yellow	Green	Red	Magenta	Blue	Pink	Pink	Blue	Pink	Orange	Magenta	Green	Green	Orange	Orange	Pink
Taylor	Yellow	Blue	Magenta	Red	Yellow	Magenta	Pink	Orange	Blue	Green	Green	Blue	Green	Green	Yellow	Red	Orange	Cyan	Cyan	Yellow
'Standard'	White	Blue	Green	Red	Yellow	Green	Red	Brown	Blue	White	White	Blue	White	Purple	Brown	Green	Green	Purple	Purple	White

# Reproducibility, standards & SOP

- People like to make their own  
– making others agree is hard



Sometimes...  
The issue  
is simply that  
their ceiling  
is  
your floor.  
@THEAFZONE



HOW STANDARDS PROLIFERATE:  
(SEE: A/C CHARGERS, CHARACTER ENCODINGS, INSTANT MESSAGING, ETC.)



# Reproducibility, standards & SOP

- People like to make their own
  - so standards proliferate
    - sometimes that can be a good thing...

'petite' or 'XS'



Female Clothing Size					
International	XS	S	M	L	XL
USA					
Korean					
UK	6 - 8	8 - 10	12 - 14	16 - 18	20 - 26
France					
Italy					

So that's why I prefer to buy my jeans from the US!

# Reproducibility, standards & SOP

- They're also around us in education/training





# Reproducibility, standards & SOP

- Today brings together several bodies from the training arena
  - organisations, projects, industry, academia...
    - GOBLET, ELIXIR-EXCELERATE, CHARME, Software & Data Carpentry, EDISON...
- What are their perspectives/views?
  - how can we train researchers to use standards?
    - & ultimately ensure reproducibility in science
  - how can we introduce standards in training?
    - how can we (should we?) make training reproducible?

# Reproducibility, standards & SOP

- This meeting is (quite) timely...



# Reproducibility, standards & SOP

- Thank you for your attention!

