

# 14<sup>th</sup> P4EU Meeting 3<sup>rd</sup>-4<sup>th</sup> December 2018

Francis Crick Institute,  
London, UK



Protein Production and Purification  
Partnership in Europe

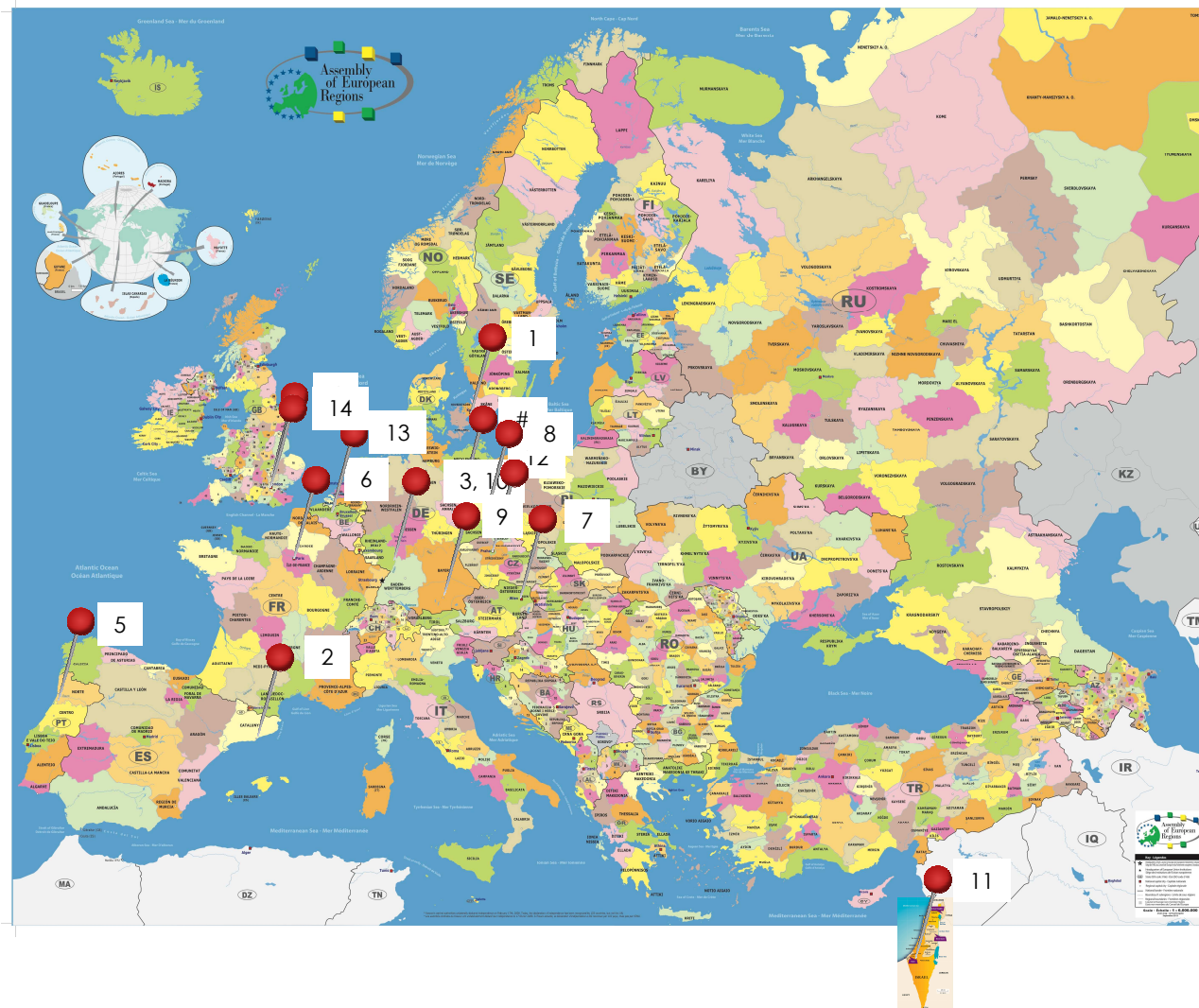


What is a P4EU meeting ?  
(and does it have anything to do with the EU?)

What is The Francis Crick Institute ?



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Partnership in Europe



- #) Kick-off, Halle, Germany, Feb 2011
- 1) Copenhagen, Denmark, Dec 2011
- 2) Barcelona, Spain, June 2012
- 3) Heidelberg, Germany Dec 2012
- 4) Oxford (SGC), UK Jun 2013
- 5) Porto, Portugal Nov 2013
- 6) Paris (CTLs), France, Jun 2014
- 7) Vienna, Austria, Dec 2014
- 8) Dresden, Germany, June 2015
- 9) Munich, Germany, Dec 2015
- 10) Heidelberg (CTLs), Germany, Jun 2016
- 11) Rehovot, Israel, Dec 2016
- 12) Prague, Czech Republic, Dec 2017
- 13) Ghent (CTLs), Belgium, July 2018
- 14) London, UK, December 2018



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## The P4EU Meeting Format



- Mix of speakers from host institute and the P4EU
- Informal
- Interactive
- Inclusive
- Inspiring

## What is the Francis Crick Institute ?

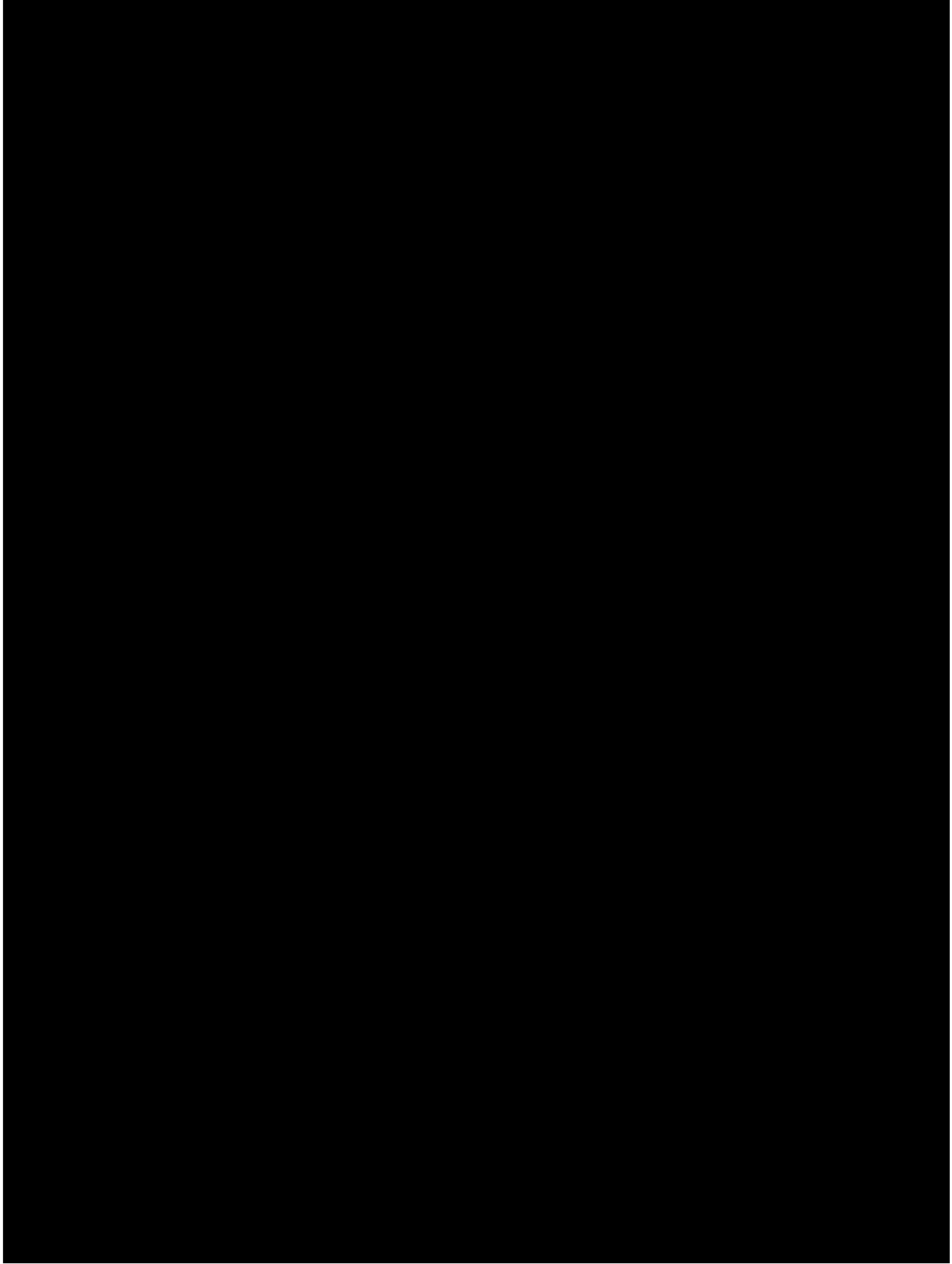


- A unique partnership established in 2007 between 6 founding partners:



- The building was transferred to the Crick 12<sup>th</sup> of August 2016

- Largest Biomedical Research Center in Europe under one roof
  - 8 storeys
  - 82,578 m<sup>2</sup> (11 Wembley stadiums)
  - 1500 staff whereof 1250 scientist – headed by Sir Paul Nurse
    - Highly International ~ 40% of staff are non-UK nationals
  - Around 100 research groups, 21 science technology platforms (STPs)
    - A 6+6 model is employed for research groups (EMBL model)



## Francis Crick Institute's science programme



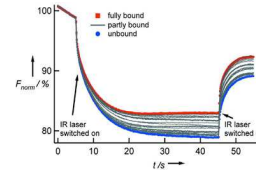
- How does a living organism acquire form and function ?
- How do organisms maintain health and balance throughout life and as they age ?
- How can we use biological knowledge to better understand, diagnose and treat human disease ?
- How does cancer start, spread and respond to therapy ?
- How does the immune system know whether, when and how to react?
- How do microbes and pathogens function and interact with their hosts?
- How does the nervous system detect, store and respond to information and retain that information throughout life?



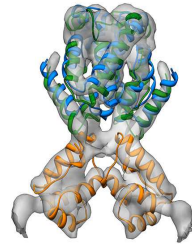


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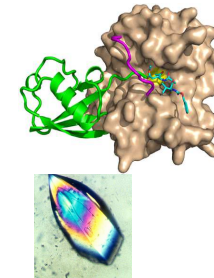
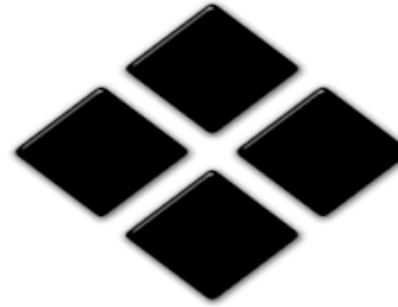
# The Structural Biology Science Technology Platform - from DNA to protein to structure



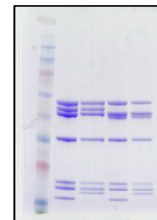
Biophysics



Single particle cryo-EM



X-ray crystallography

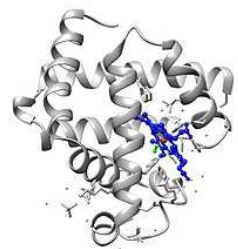


Protein Expression &  
Purification



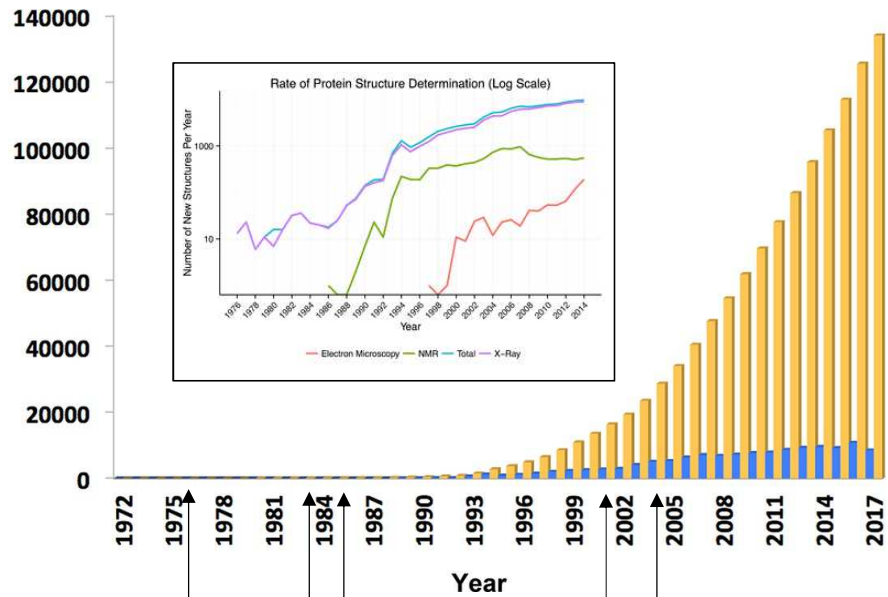
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# The scientific programme



Myoglobin 1958

First recombinant protein  
Expression in *E. coli*



1975 First report of recombinant expression in insect cells

1984 Invention of PCR

2002 Structural Genomics Consortium

2003 The Human Genome sequenced

## ARTICLE

doi:10.1038/nature23002

### Cryo-EM structures of tau filaments from Alzheimer's disease

Anthony W. P. Fitzpatrick<sup>1</sup>, Benjamin Falcon<sup>1</sup>, Shaoda He<sup>1</sup>, Alexey G. Murzin<sup>1</sup>, Garib Murshudov<sup>1</sup>, Holly J. Garringer<sup>2</sup>, R. Anthony Crowther<sup>1</sup>, Bernardino Ghetti<sup>2</sup>, Michel Goedert<sup>1,§</sup> & Sjors H. W. Scheres<sup>1,§</sup>

Nature. 2017 Jul 13;547(7662):185-190

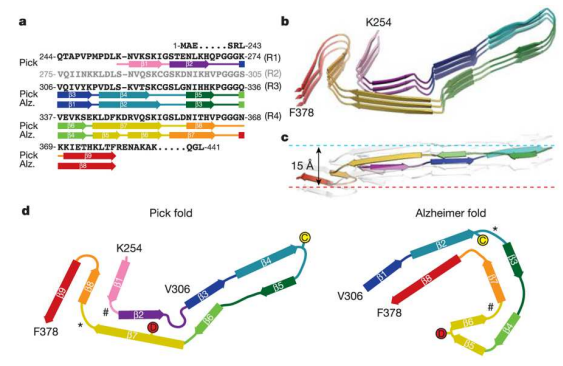
## LETTER

https://doi.org/10.1038/s41586-018-0454-y

### Structures of filaments from Pick's disease reveal a novel tau protein fold

Benjamin Falcon<sup>1</sup>, Wenjuan Zhang<sup>1</sup>, Alexey G. Murzin<sup>1</sup>, Garib Murshudov<sup>1</sup>, Holly J. Garringer<sup>2</sup>, Ruben Vidal<sup>2</sup>, R. Anthony Crowther<sup>1</sup>, Bernardino Ghetti<sup>2</sup>, Sjors H. W. Scheres<sup>1,3\*</sup> & Michel Goedert<sup>1,3\*</sup>

Nature. 2018 Sep;561(7721):137-140





*P4EU Meeting at The Francis Crick Institute*

Programme for the 14<sup>th</sup> P4EU meeting – Monday 3<sup>rd</sup> of December 2018

Time	Speaker	Title
<b>8.30-9.00</b>	Registration and refreshments	
<b>9.00-9.15</b>	Dr Svend Kjær, Francis Crick Institute, London	Welcome
<b>9.15-9.30</b>	Dr Nick Berrow, IRB, Barcelona	About P4EU
<b>9.30-10.00</b>	Dr Donald Benton, Francis Crick Institute, London	Structure of full-length Influenza Haemagglutinin determined by cryo-EM
<b>10.00-10.30</b>	Dr Frank Bernhard, Goethe Universität, Frankfurt am Main	Cell-free production of membrane protein complexes
<b>10.30-11.00</b>	Coffee break	
<b>11.00-11.30</b>	Dr Imre Berger, University of Bristol	The MultiBac baculovirus/insect cell system for multiprotein complex production
<b>11.30-12.00</b>	Fabien Bonneau, MPI for Biochemistry-Munich	Expression of Large Protein Complexes in HEK293 Stable Pools
<b>12.00-12.30</b>	Dr Florian Weissman, Francis Crick Institute, London	Expressing multi-subunit complexes using biGBac
<b>12.30-12.50</b>	Dr Patrik Eickhoff, Francis Crick Institute, London	Microscale purification of reconstituted eukaryotic replisome assemblies for cryo-EM studies
<b>13.00-14.00</b>	Lunch	
<b>14.00-14.20</b>	Dr Veronique Birault, Francis Crick Institute, London	Translational activities at the Crick
<b>14.20-14.50</b>	Dr Mohammed Ismail, Francis Crick Institute, London	Characterisation of a cyclic peptide that binds the p110 $\alpha$ -RBD and blocks its interaction with RAS
<b>14.50 - 15.30</b>	Dr Darren Tomlinson, The Astbury Centre for Structural Molecular Biology, University of Leeds	Affimers – novel tools for studying protein function
<b>15.30-16.00</b>	Coffee Break	
<b>16.00-16.30</b>	Dr Nicola Burgess-Brown, SGC, Oxford	A BacMam Expression Pipeline to Produce Human Membrane Proteins for Structural and Functional Studies
<b>16.30-16.45</b>	Dr Tsafi Danieil, Hebrew University of Jerusalem	Solving traffic jams in protein secretion
<b>16.45-17.00</b>	Dr Mario Lebendiker, Hebrew University of Jerusalem	New insights in IEX-MALS
<b>17.00-17.30</b>	Dr Amit Gupta, NanoTemper (Sponsor talk)	Application of thermo-optical methodology in biophysical drug discovery

Social event with food and drinks for P4EU delegates, speakers and sponsors at Norfolk Arms (<https://norfolkarms.co.uk/>) from 19.00 onwards



*P4EU Meeting at The Francis Crick Institute*



Programme for the 14<sup>th</sup> P4EU meeting – Tuesday 4<sup>th</sup> of December 2018

Time	Speaker	Title
<b>8.45-9.15</b>	Arrival and coffee	
<b>9.15-9.45</b>	Dr Birgit Dreier, University of Zurich	Binders for Challenging Tasks - A High-Throughput DARPIn Selection and Validation Pipeline
<b>09.45-10.15</b>	Dr Bjørn Voldborg, DTU Biosustain, Novo Nordisk Foundation Center for Biosustainability, Copenhagen	Using a CRISPR/Cas9 based HT cell engineering platform to obtain hard to produce proteins
<b>10.15-10.45</b>	Dr Joop Van den Heuvel, Helmholtz Centre for Infection Research, Braunschweig	„CCMCE“ - CRISPR-Cas9 Mediated Cassette Exchange and improving cell lines for transient gene expression
<b>10.45-11.15</b>	Coffee break	
<b>11.15-11.45</b>	Dr Sanne Schöffelen, DTU Biosustain, Novo Nordisk Foundation Center for Biosustainability, Copenhagen	Organic chemistry on proteins: From side-reaction to highly selective N-terminal modification of proteins
<b>11.45-12.15</b>	Dr Malin Bäckström, University of Gothenburg	Production of proteins for structural biology in mammalian cells
<b>12.15-12.45</b>	Dr Renaud Vicentelli, Laboratoire Architecture et Fonction des Macromolécules Biologiques, Marseilles	HTP production of a newly designed library of soluble human single and tandem PDZ domains allows semi-quantitative PDZ-peptide interaction screening through HTP holdup assay
<b>12.45-13.30</b>	Lunch	
<b>13.30-14.15</b>	Dr James Errey, Heptares Therapeutics, Ltd	Fusing structural and biophysical characterisation of GPCRs for drug discovery
<b>14.15-14.45</b>	Dr Yoav Peleg, Weizmann Institute of Science, Rehovot	The P4EU PROSS benchmark
<b>14.45-15.10</b>	Dr Ross Kettleborough, Technical Director for Europe, Twist Biosciences (Sponsor talk)	You Design It, We Build It
<b>15.10-15.40</b>	P4EU-related matters	
<b>15.40-16.10</b>	Tour of the Crick for P4EU delegates	
	End of meeting	





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# Points-of-interest



**Google's DeepMind predicts 3D shapes of proteins**

**AI program's understanding of proteins could usher in new era of medical progress**

The composite image includes a Google Map of St Pancras International in London, showing landmarks like the Francis Crick Institute, St Pancras International station, and King's Cross Pancras Underground. It also features a news article snippet about Google's DeepMind AI predicting protein 3D shapes, a photo of a Go board game being played, and a photo of a restaurant interior.



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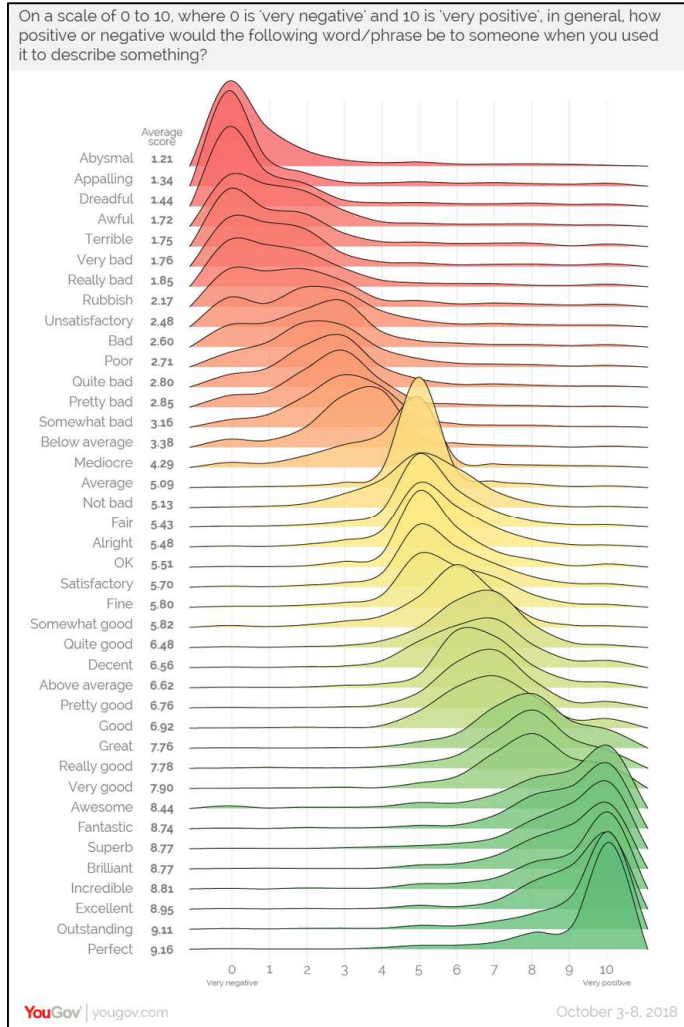


Cell Disruption Made Easy

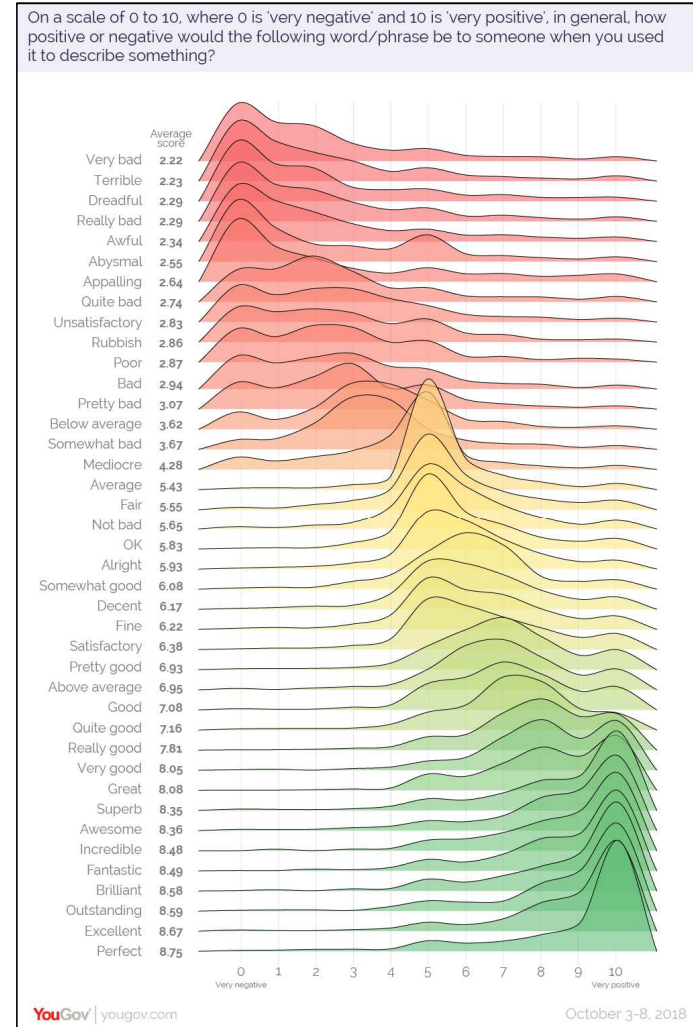
- Louise Howitt and the Event and Conference organization team



# Let's have a ..... P4EU meeting



UK-English



US-English