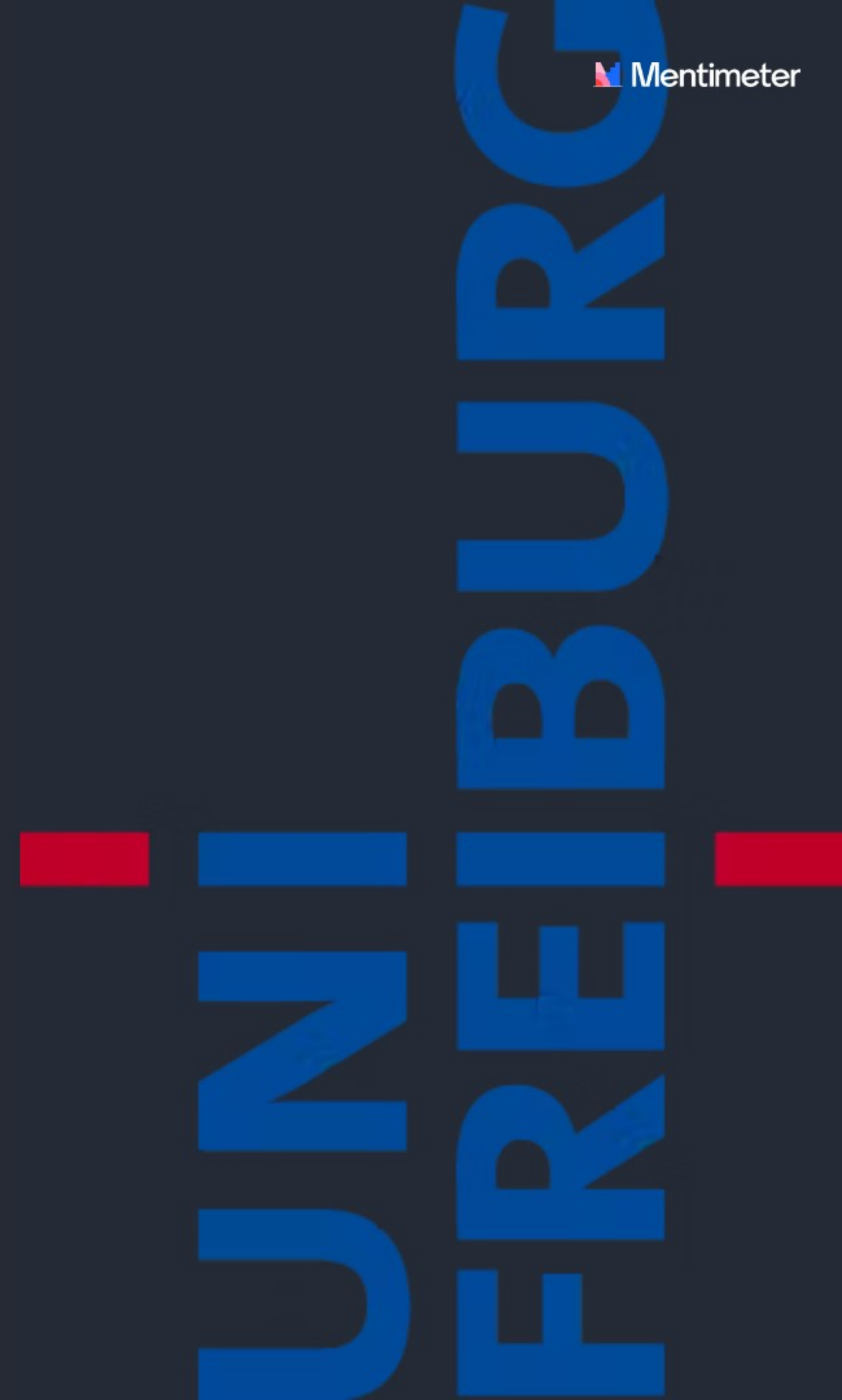


Designing an Effective Poster

Naomi Peck



Instructions



Imagine you're at a poster session.

Use the thumbs up/down reactions to indicate whether you'd approach the poster.

Use the heart reaction if you enjoy the poster design.



10% TCA	1 min	1.34 ± 0.08
10% TCA	2 min	1.41 ± 0.1
10% TCA	3 min	1.34 ± 0.1
10% TCA	5 min	1.31 ± 0.04
10% TCA	15 min	1.25 ± 0.1
10% TCA	30 min	1.44 ± 0.1

and whole crown etching with 10% TCA for 15 min and whole crown etching with 10% TCA for 30 min. Furthermore, the 5-minute etching resulted in the removal of a 13.4 μm layer of superficial enamel, corresponding to 0.23 mg of enamel. EDTA was not as effective as HCl for production of enamel samples. As expected, the longer exposures to acid will result in the removal of enamel from deeper layers, and different time periods can be employed depending on the desired amount of enamel. Additionally, successive acid attacks can be used to remove deeper layers.

Some samples were run on gels, some were directly prepared for Mass Spectrometry

2.3. Mass Spectrometry of samples using matrix assisted laser desorption/ionization - time-of-flight mass spectrometer (MALDI-TOF) followed by protein search against the database SWISS-PROT.

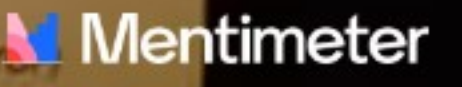


Figure 4



Figure 4. MS spectrum resulted in the identification of ameloblastin (*) and amelogenin (+) peptides in a porcine enamel sample obtained by the restricted area etching procedure directly submitted to mass spectrometry (without protein separation in an SDS-PAGE gel).

Results

Figures 3-5 show mass spec results of peptides whose search against a protein database rendered results that indicate successful identification of peptides that are specific to the dental enamel.

Figure 3



Results

Figures 1-2 show gel electrophoresis of enamel proteins extracted by the conventional method (Fig. 1) and by the superficial etching method (Fig. 2).

Figure 1



Figure 1. Silver-stained SDS-PAGE protein profile of mature human teeth. Lane 1: molecular weight marker; Lane 2: proteins extracted from mature teeth (with mature enamel) by whole crown etching with 11.2% EDTA for 1 min.

Figure 2

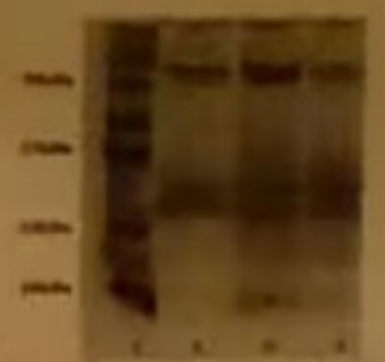


Figure 2. Silver-stained SDS-PAGE protein profile of immature porcine teeth. Lane 1: molecular weight marker; Lane 2, 3, and 4: samples from three different porcine teeth gnomes. Bands A, peptide fingerprinting resulted in the identification of ameloblastin and amelogenin from these bands; band B: ameloblastin was identified in this band; band C: amelogenin was identified in this band.



Figure 6. Schematic illustration of techniques used in this study. Left Sequence: The enamel powder is dissolved and precipitated by TCA. Middle Sequence: whole crown etching by HCl 10% for 5 min. Right Sequence: The restricted area etching (so far effective for protein recovery from immature porcine teeth).

Fig. 5. MS analysis of enamel extracted from mature human teeth. A) MS spectrum of enamel powder of mature human teeth obtained by TCA precipitation. The samples were not separated by SDS-PAGE, but directly prepared for MS. Three Amelogenin -X isoforms tryptic peptides were identified. B) Mass spectrum of CID-MS/MS of ion m/z 1307.62 of the amelogenin peptide, which allowed deduction of the amino acid sequence of an amelogenin -X isoform peptide with the amino acid sequence WYQSRPPYF.

Figure 5



Figure 4

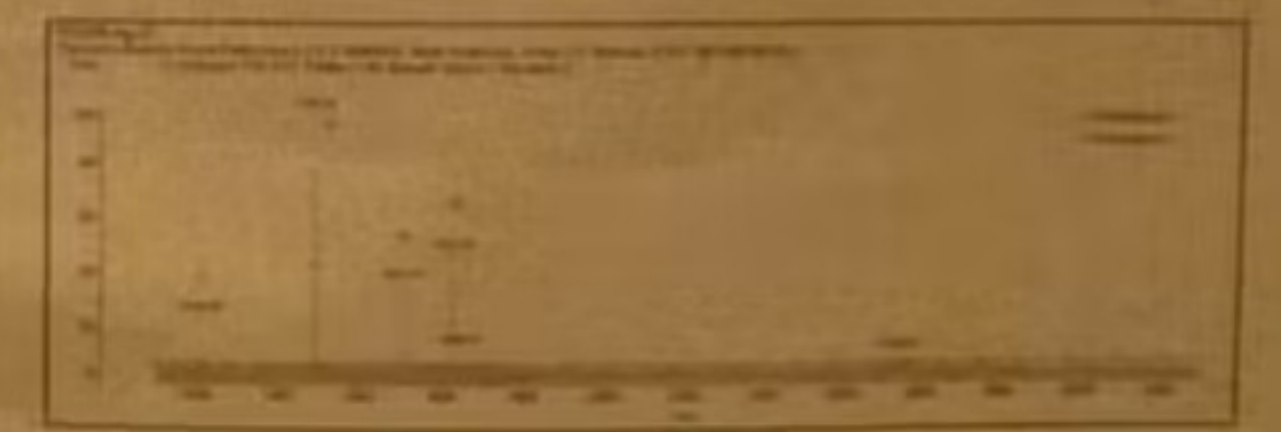
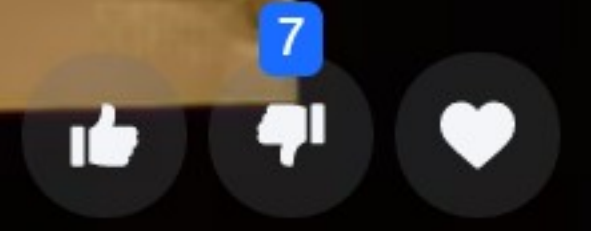


Figure 4. MS spectrum resulted in the identification of ameloblastin (*) and amelogenin (+) peptides in a porcine enamel sample obtained by the restricted area etching procedure directly submitted to mass spectrometry (without protein separation in an SDS-PAGE gel).

Conclusions





Premise, Overview

Genomic medicine: challenge and promises

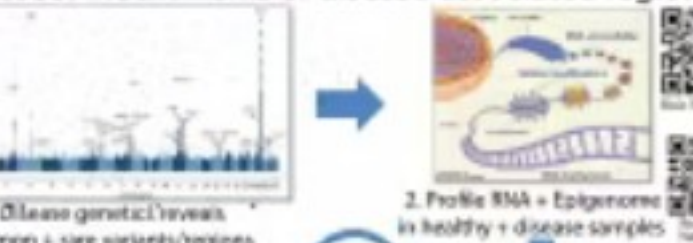
The promise of genetics
- Disease mechanism
- New target genes
- New therapeutics
- Personalized medicine

The challenge of mechanism
- 90+% disease hits non-coding
- Target gene not known
- Causal variant not known
- Cell type of action not known
- Relevant pathways not known
- Mechanism not known

Non-coding circuitry helps interpret disease loci

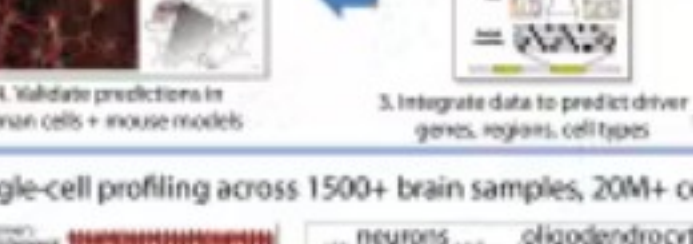


Dissect mechanisms of disease-associated regions

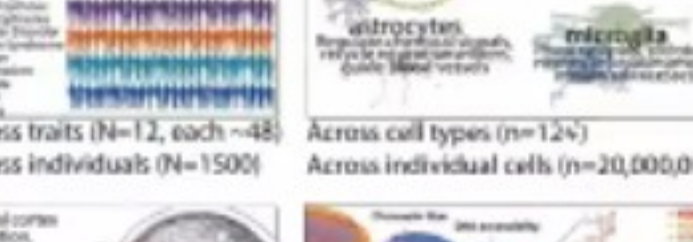


Spatial, Anatomical

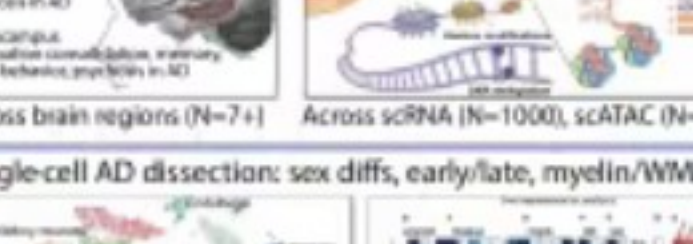
Deep Learning for Spatial Transcriptomics + Single-cell Integration



Single-cell profiling across 1500+ brain samples, 20M+ cells



Single-cell AD dissection: sex diffs, early/late, myelin/WML



Pathogen-associated changes in AD

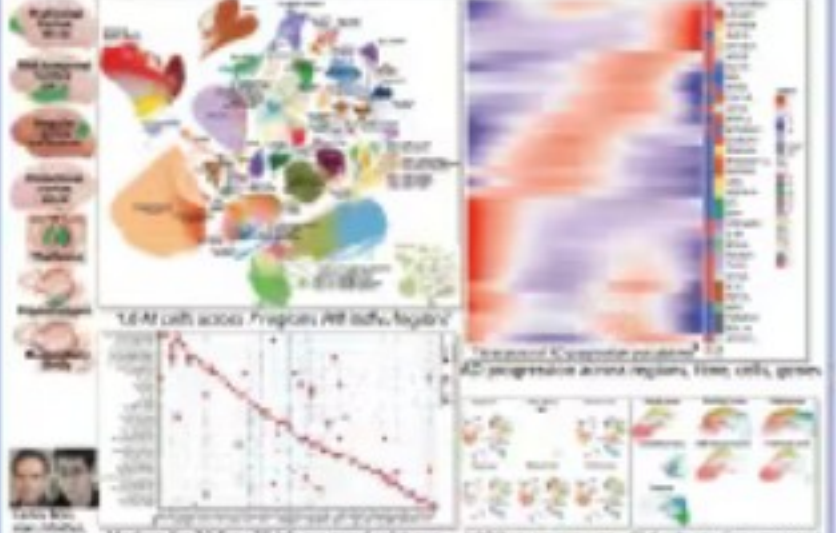


Pathogens: HSV, CMV

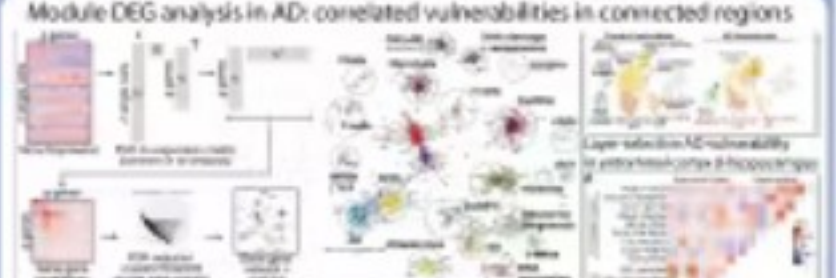


Multi-Region, Modules

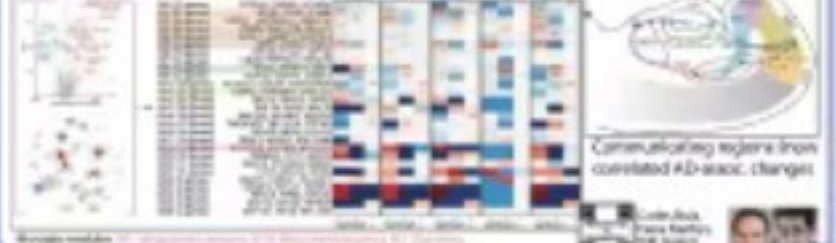
Spatio-temporal AD progression across brain regions, cells, genes, pathology



Module DEG analysis in AD: correlated vulnerabilities in connected regions



Dissect mechanisms of disease-associated regions



scATAC, GWAS, TFs, Epigenome Erosion

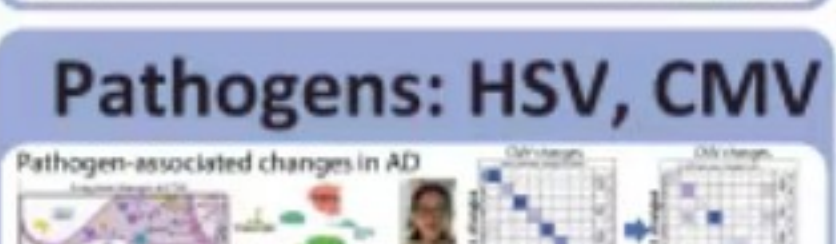
scATAC-scrNA Epigenome-Transcriptome Linking & Integration



Cell-type-specific GWAS enrichments for scATAC-seq peaks



scATAC evidence of epigenome erosion in late AD across cell types



Pathogens: HSV, CMV

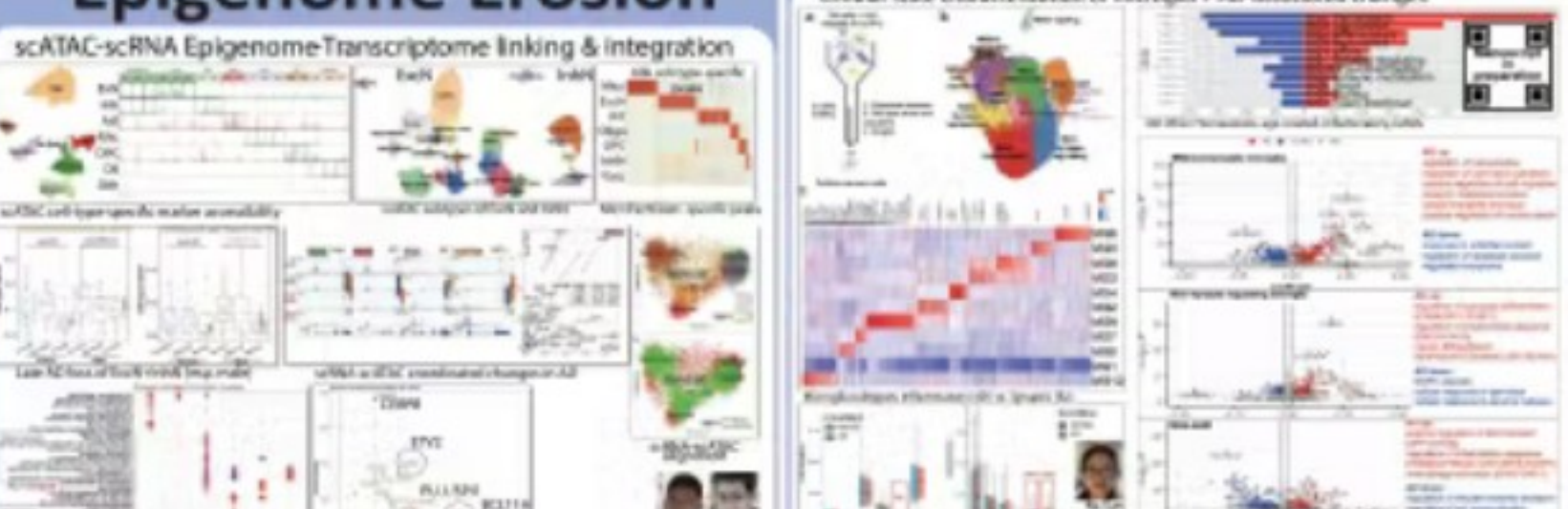


Pathogens: HSV, CMV



Microglia, Vasculature

Cellular state characterization of microglia + AD-associated changes



Vasculature/BBB characterization, zonation, vC cells, DEGs



scATAC-seq cell-type-specific GWAS enrichments



AD Psychosis, Schizo

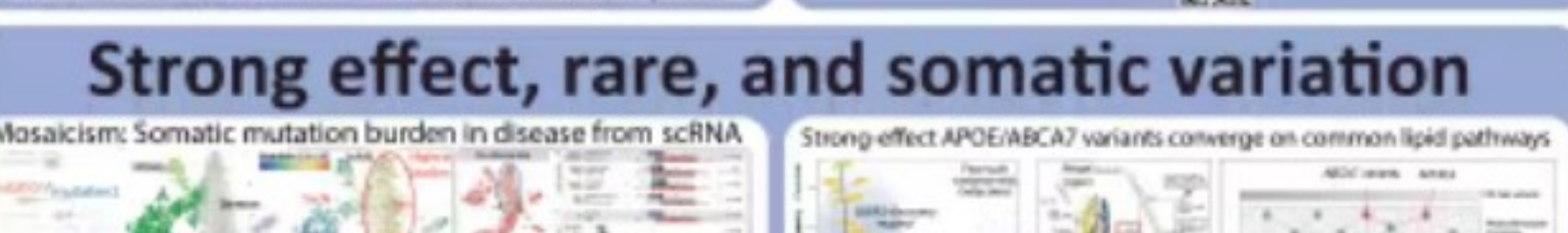
Psychosis in AD: broad repression of neuronal activity



Single-cell insights into schizophrenia genetics/dysregulation



Master regulators of Sz DEGs: GWAS hits, devel/synaptic func.



Strong effect, rare, and somatic variation

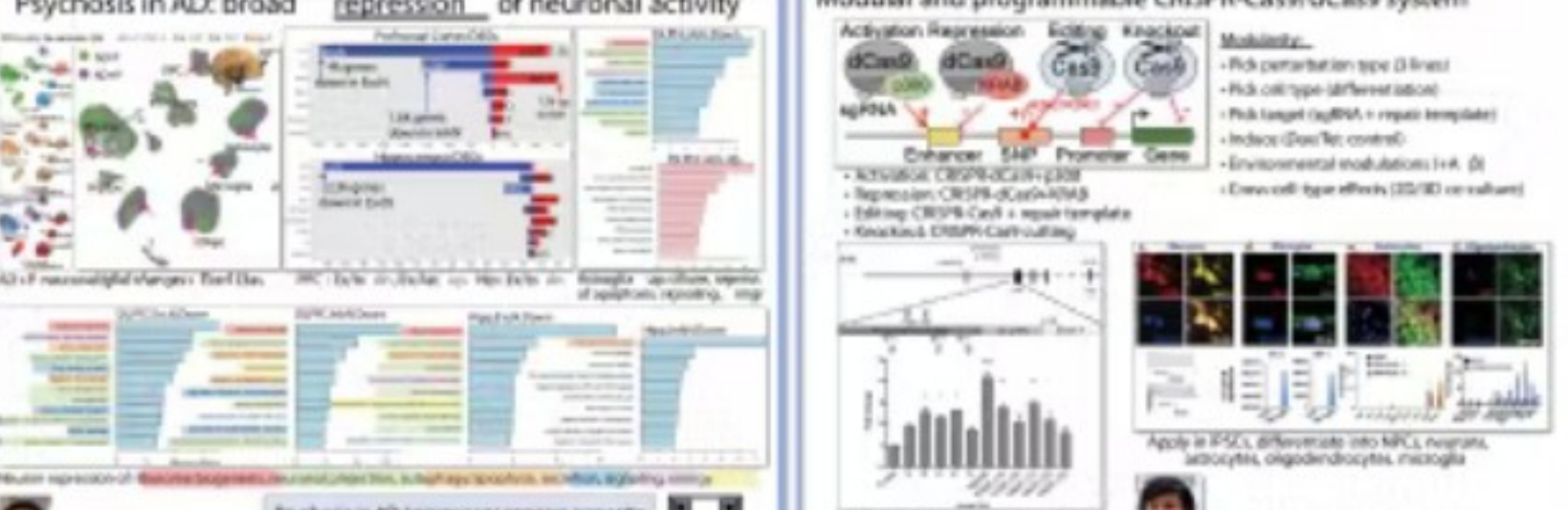


Strong effect, rare, and somatic variation

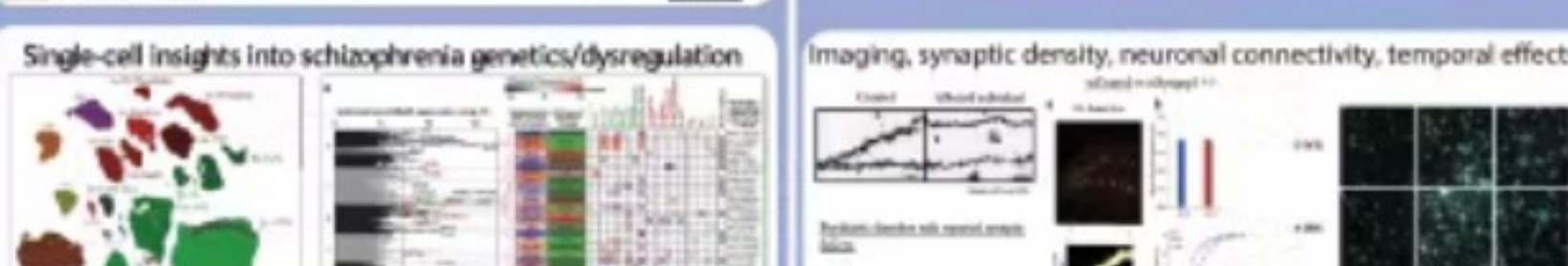


Experimental Validation

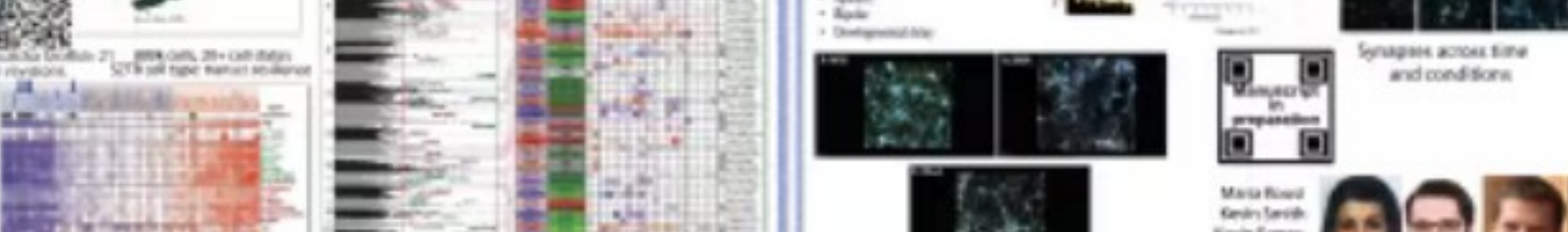
Modular and programmable CRISPR-Cas9/dCas9 system



Imaging, synaptic density, neuronal connectivity, temporal effects

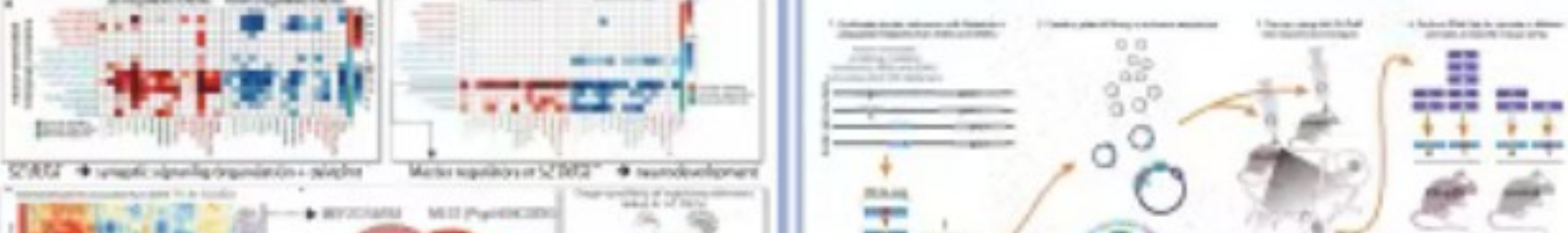


High-throughput in vivo reporter assay in mouse brain

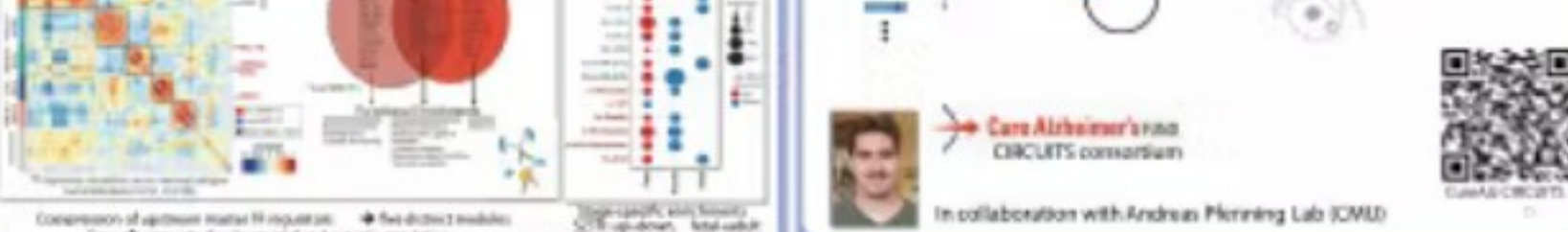


Molecular Phenotypes

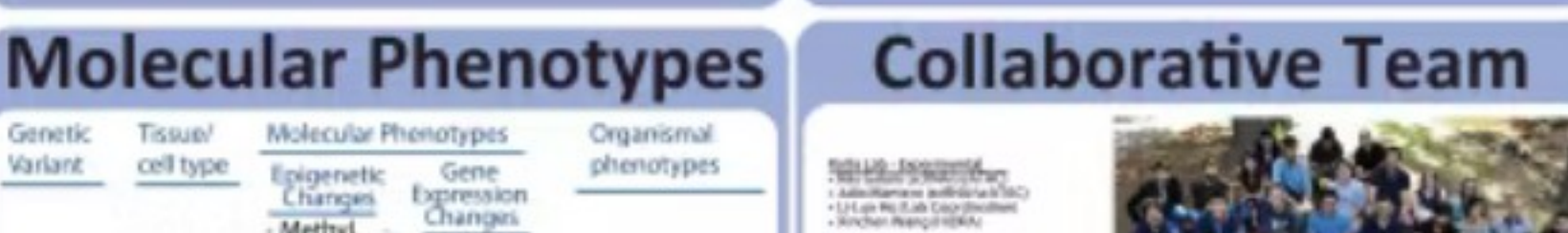
Genetic Variant, Tissue/cell type, Molecular Phenotypes, Organismal phenotypes



Collaborative Team



Collaborative Team



Collaborative Team



Collaborative Team



particular. These photos are available to the public via the internet.

In this poster, I present and discuss numerous examples of insect/arthropod-like forms (fossil & living) found in Mars rover photos. Examples include insect-like forms displaying apparent diversity, clearly recognizable insect/arthropod anatomical features, and flight. Evidence of a fossil reptile-like (serpentine) form as well as apparent living reptile-like forms preying on insect-like forms is also presented. Each example is documented. These findings provide a compelling basis for further study and raise many important questions. (DOI: 10.13140/RG.2.2.11836.39041)

INTRODUCTION

Interest in the possibility of life on Mars (Dass, 2017), a desire to find useful resources for technology, possible colonization (Levine & Schild, 2010), and a great sense of adventure has stimulated research and development in regard to reaching Mars. Accordingly, earlier projects involved placing spacecraft in orbit around Mars to send back photos of the Martian surface. More recently, unmanned vehicles have been sent to land on the Martian surface to relay images of the surroundings back to Earth and to collect information about the surface and from shallow drill holes. Onboard instrumentation has tested for evidence of past and present life via indicators of organic activity, namely "biosignatures" (Cady et al., 2004; Levin, 2019).

Another approach has been to seek out and analyze the structural, physiological, and biochemical adaptations of Terran organisms that are able to live under extreme environmental conditions, that is "extremophiles" (Merino et al. 2019,). This approach has been almost entirely focused on microbes, though metazoans, e.g. tardigrades, and some insects and reptiles have been found in extreme habitats on Earth.

My intent in this poster is to present evidence of fossil and living insect- and reptile-like forms on Mars. A few of many findings are included and additional results will be published soon. Repeatability and corroboration are among the hallmarks of the scientific method and as it is likely that at least some NASA/JPL personnel are acquainted with Martian insect- and reptile-like creatures, the research reported here can reasonably be viewed as replicative and corroborative.

The arthropod body plan with repeating body segments, a typically tough, resilient exoskeleton, along with a high degree of physiological and biochemical adaptability are among the characteristics that make members of this group prime candidates for thriving under harsh environmental conditions. Likewise Terran reptiles are commonly found in extreme environments.

Based on preliminary examination of Mars rover photographs, I formulated the following broad, hypothesis as the basis for the research reported here: There are fossilized and living forms on Mars, including insect/arthropod- and reptile-like forms.

MATERIALS & METHODS

The NASA-JPL images relayed to Earth by land-based vehicles ("rovers"), sent to Mars via spacecraft are available to the public on the internet. This database of photos, both raw images and compiled panoramic mosaics, that has been collected over many years by several different missions has been used in this study, mostly from Curiosity rover (NASA/JPL). Individual images were carefully studied while varying photographic parameters such as brightness, contrast, saturation, inversion, and so on. No content was added, or removed.

The following criteria were useful in identifying life forms: dramatic departure from the surroundings, clarity of form, body symmetry, segmentation of body parts, repeating form, skeletal remains, and observation of forms in close proximity to one another. Particular postures, evidence of motion, flight, apparent interaction as suggested by relative positions, and shiny eyes were taken to be consistent with the presence of living forms. Once a clear image of a given form was identified and described, it was useful in facilitating recognition of other less clear, but none-the-less valid, images of the same basic form.

The descriptions and interpretations of images are somewhat tentative, and may well change with more study and as knowledge of Martian fauna increases. I encourage you to check my findings for yourself. The URLs of the photos used will be listed on my website, scienceofentomology.com and in formal publication of this material in the future.

RESULTS

It appears that the "Red Planet" enjoys a surprising abundance of higher life forms.

An exoskeleton and jointed appendages are sufficient to establish identification as an arthropod (Romoser & Stoffolano, 1995). Three body regions, a single pair of antennae, and six legs are traditionally sufficient to establish identification as "insect" on Earth. These characteristics should likewise be valid to identify an organism on Mars as insect-like. On these bases arthropodan insect-like, forms can be seen in the Mars rover photos.

Many insect-like creatures and putative diversity were observed (Plate 1). The most common insect-like forms are robust and loosely resemble bumble bees or carpenter bees on Earth. For convenience, with no taxon necessarily implied, I'll refer to these creatures as "bees" from this point on. The "bees" appear to vary in size and type.

Several characteristic insect/arthropod anatomical features were identifiable (Plate 2), not all on the same individual, but as a mosaic among individuals.

Distinct flight behavior was evident in many images, e.g. Plates 3 & 4. In one case observed, the flight maneuver was impressive with the individual "bee" plunging straight down the side of a cliff and leveling off just before hitting the ground (Plate 4).

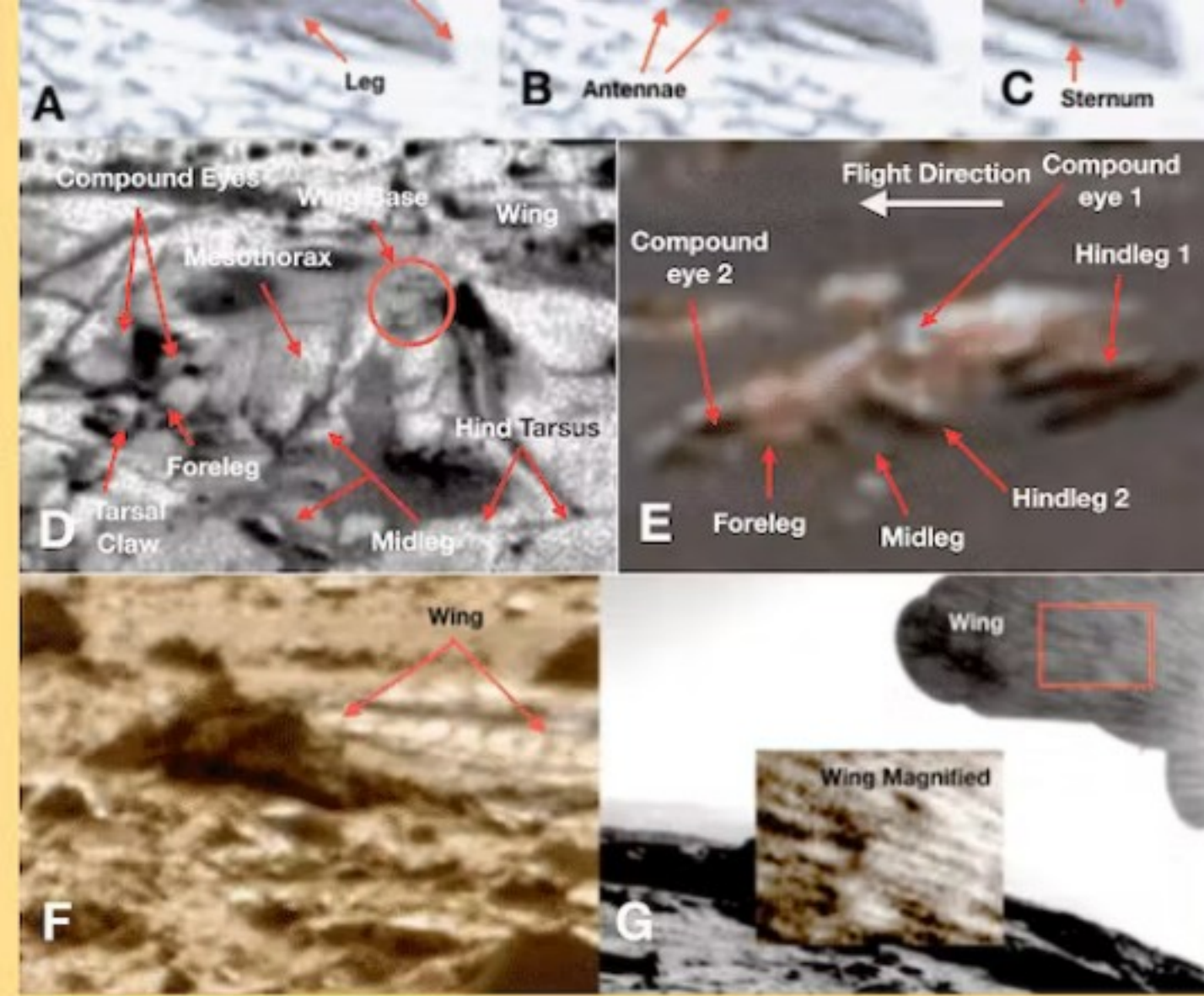


Plate 2. Various anatomical structures seen in different photos. A - E and probably F are "bee-like", but not necessarily the same type. (A & B) A specimen whose head appears to have turned in the direction of the camera (based on the scale provided in the photo from which this was extracted, this individual is estimated to be approximately 20 inches long). (C) Abdomen of specimen from "a." (D) Individual on ground with head facing left with head & thorax visible. (E) Individual flying with legs evident and, though in flight, somewhat comparable to the specimen in D; Compound eyes and hindlegs labeled in two positions since in motion. Relative to D & E, the locations, shapes, sizes, and appearance of the legs suggest that the forelegs, with putative distal chelate structures, are grasping; the midlegs, digging; and the hindlegs, jumping & running. (F) Specimen on ground with wing(s) toward the right. Longitudinal veins, cross veins, and wing cells evident. (G) Part of wing of specimen apparently caught on the rover; inset: enlarged portion of wing. Longitudinal veins, cross veins, and cells are evident.

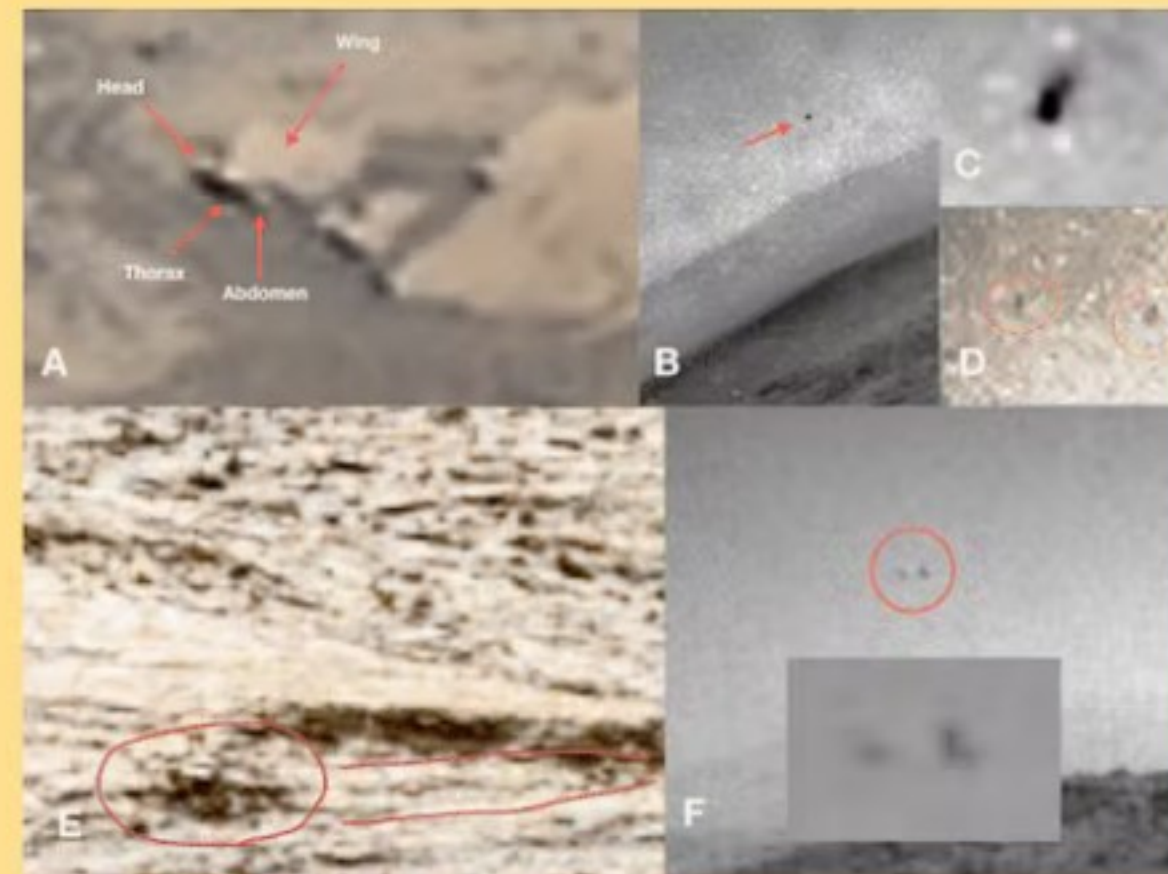


Plate 3. Insect-like forms in flight. (A) At least two apparent insect-like creatures flying close to one another. (B) Putative insect-like forms in a darkening sky. (C & D) Extracts from "b" with evidence of wings beating (light spots encircling the dark bodies). (E) An insect-like specimen ("bee") that appears to have flown right to left from what could be a cave or an entrance to the underground. (F) Two putative insect-like specimens in flight contrasted with the darkening sky; Insert: enlarged view.

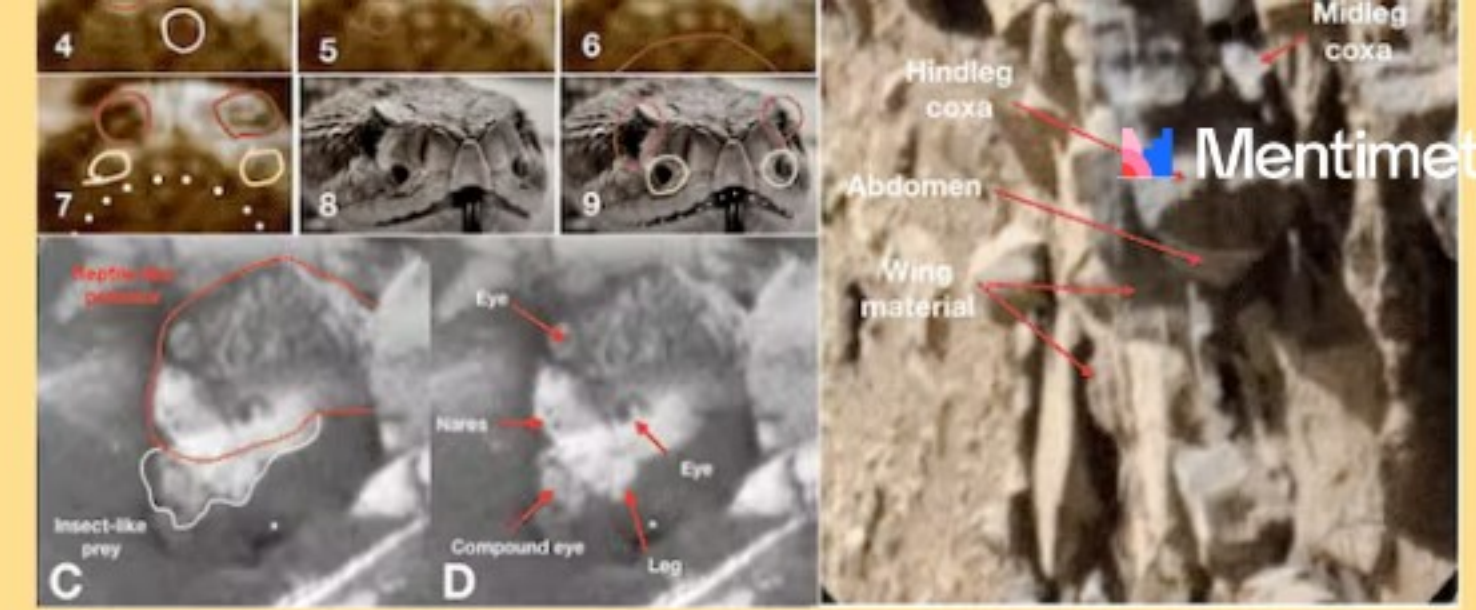


Plate 5. (A) Frontal view of a putative reptile-like fossil compared to a Terran snake. 1. Frontal view of putative fossil (circled) in a debris field. 2. Enlarged frontal view of fossil. 3. Midline symmetry indicated. 4. Eyes and small oral opening circled. 5. Bilateral punctate structures indicated. 6. large, full-gape, oral opening. 7. Eyes, lateral punctate structures, and large mouth capable of gaping are indicated. 8. Frontal view of Eastern King Snake head (Original photo). 9. King snake with eyes and bilateral punctate structures circled. (B) Putative fossil insect on its dorsum with head to the top, and with selected structures labelled. (C & D) Apparent predatory behavior showing reptile-like creature with insect-like creature in its mouth.

CONCLUSIONS

Evidence presented here supports the following:

There are fossilized insect- and reptile-like forms on Mars.

There are extant insect- and reptile-like forms on Mars.

There has been and still is life on Mars.

The presence of wing veins and spiracles are consistent with tracheal ventilation.

There is apparent diversity among the Martian insect-like fauna which display many features similar to Terran insects that are interpreted as advanced groups, for example the presence wings, wing flexion, agile gliding/flight, and variously structured leg elements.

Sheltering and nesting of the insect-like forms in caves and possibly burrows beneath the surface are consistent with life in a harsh and variable environment.

Insect-like Martian forms appear to be preyed upon by reptile-like forms.

DISCUSSION

To my knowledge, aside from circumstantial evidence presented in the literature (Levin, 2019), the meaning of which is debated among astrobiologists, this is the first professional report of direct evidence of identifiable life forms beyond the confines of Earth. While any given image does not in itself prove anything, I believe the mosaic of what I have described is compelling. And as stated above, I view the research reported here to be replicative and corroborative. It is very clear that much more study of the photos is needed. The information presented here barely scratches the surface.

Given our current understanding of the fundamental ways living organisms function, and the putative patterns of the evolution of life on Earth, I would guess that most biologists have expected to find life on other planets, and would not be particularly surprised to find carbon-based biological processes/mechanisms as well as similarities in patterns and interactions at the various levels of organization. This is not to say there couldn't be other-than-carbon systems operating as well. I also think we can logically expect to find evidence of the operation of evolution and natural selection. Discussions pertinent to these ideas include the following: Sephton & Carter, 2015; Cabrol & Grin, 2018.

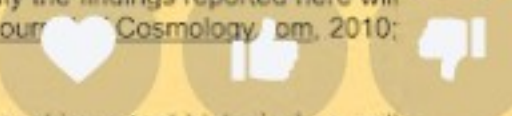
The presence of higher metazoan organisms on Mars implies the presence of nutrient/energy sources and processes, food chains and webs, and water as elements functioning in a viable, if extreme, ecological setting sufficient to sustain life. I have observed instances suggestive of standing water or small water courses with evident meander and with the expected blurring of small submerged rocks, larger emergent rocks at the atmosphere/water interface, a moist bank area, and a drier area beyond the moist area. Water on Mars has been reported a number of times (Rothschild and Mancinelli, 2001), including surface water detected by instrumentation on Viking, Pathfinder, Phoenix and Curiosity (Levin, 2019).

The question that looms especially large at this point is consideration of how life forms reach a given planet (or any cosmic body), that is the question of origin(s) of life. Stated in terms of this research, did life originate on Earth and Mars independently; or did it originate on either Mars or Earth and find its way to the other; or finally did it find its way to these planets from elsewhere in our solar system, galaxy, or beyond? Hopefully the findings reported here will enter into the exciting discussions of panspermia (Crick, 1981; Russell et al., 2011; *Journal of Cosmology*, pm, 2010; Kaufman, 2017).

The evidence of life on Mars presented here provides a strong basis for many additional important biological as well as social and political questions. It also represents a solid justification for further study. A recent book published by the National Academies of Sciences, Engineering, and Medicine (2019) looks to the future of astrobiology and the search for life on other planets. This book is a must-read for anyone interested in the future of life on Earth and Mars.

4

5



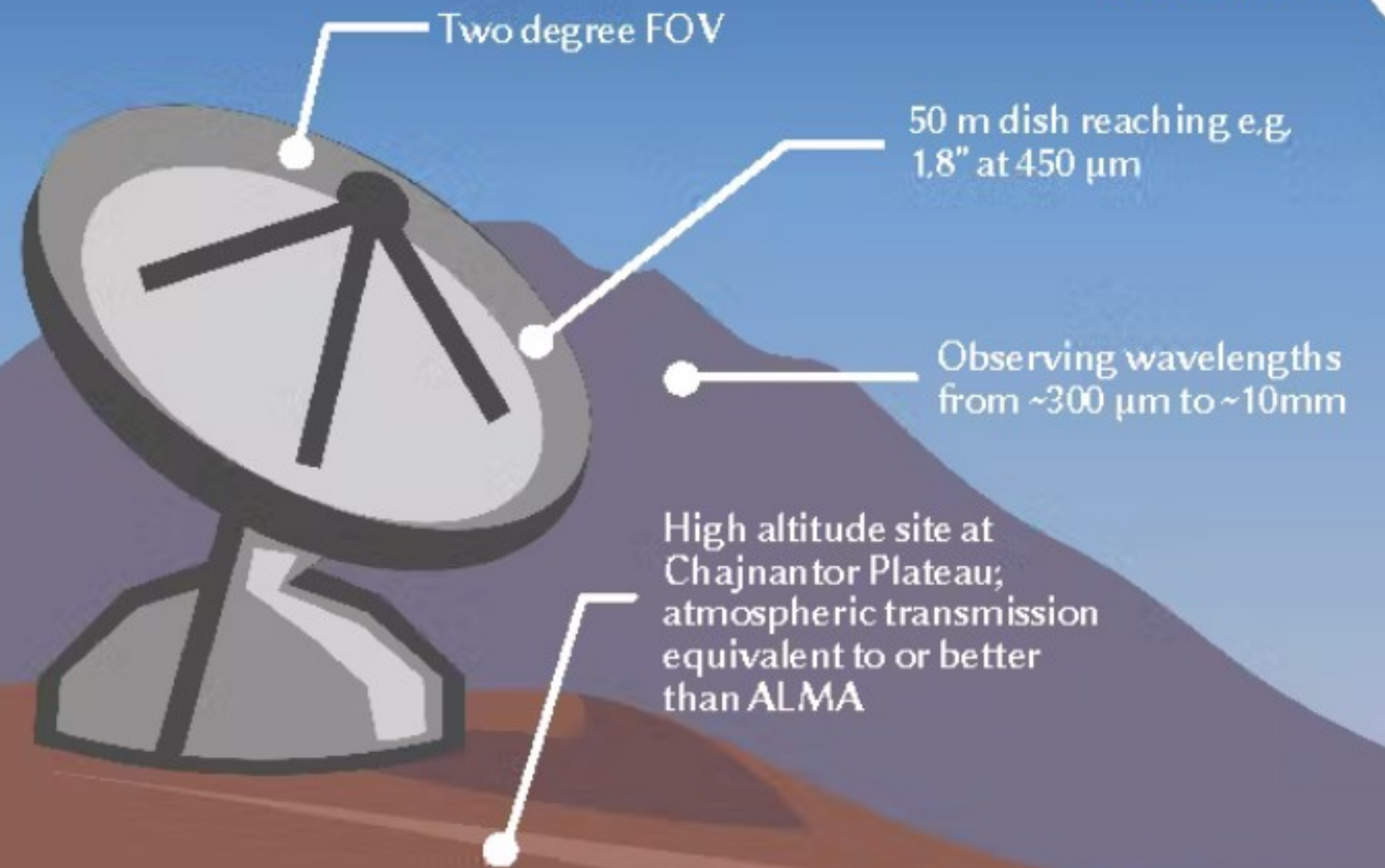
J. Ramasawmy¹, P. Klaassen¹, J. E. Geach², C. Cicone³ on behalf of the AtLAST collaboration

¹UK Astronomy Technology Centre, ²University of Hertfordshire, ³University of Oslo

To obtain a complete census of dust in galaxies across cosmic history, we require a high throughput survey facility that can reach high sensitivities and resolutions – a necessary complement to high-resolution interferometric observatories such as ALMA.

The Atacama Large Aperture Submillimetre Telescope (AtLAST), a concept for a 50 m single dish community facility to be built in the 2030s, will be able to photometrically and spectroscopically survey large areas at high resolutions, pushing the confusion limit to sub-mJy levels and enabling the detections of “normal” (L^*) galaxies to very high redshifts.

- FIRST LIGHT INSTRUMENTATION GOALS:**
- A highly multiplexed (~1000 pixel) heterodyne array [2]
 - Wide field, multi-chroic continuum camera
 - Wide band IFU [3]
 - Multi object spectrograph

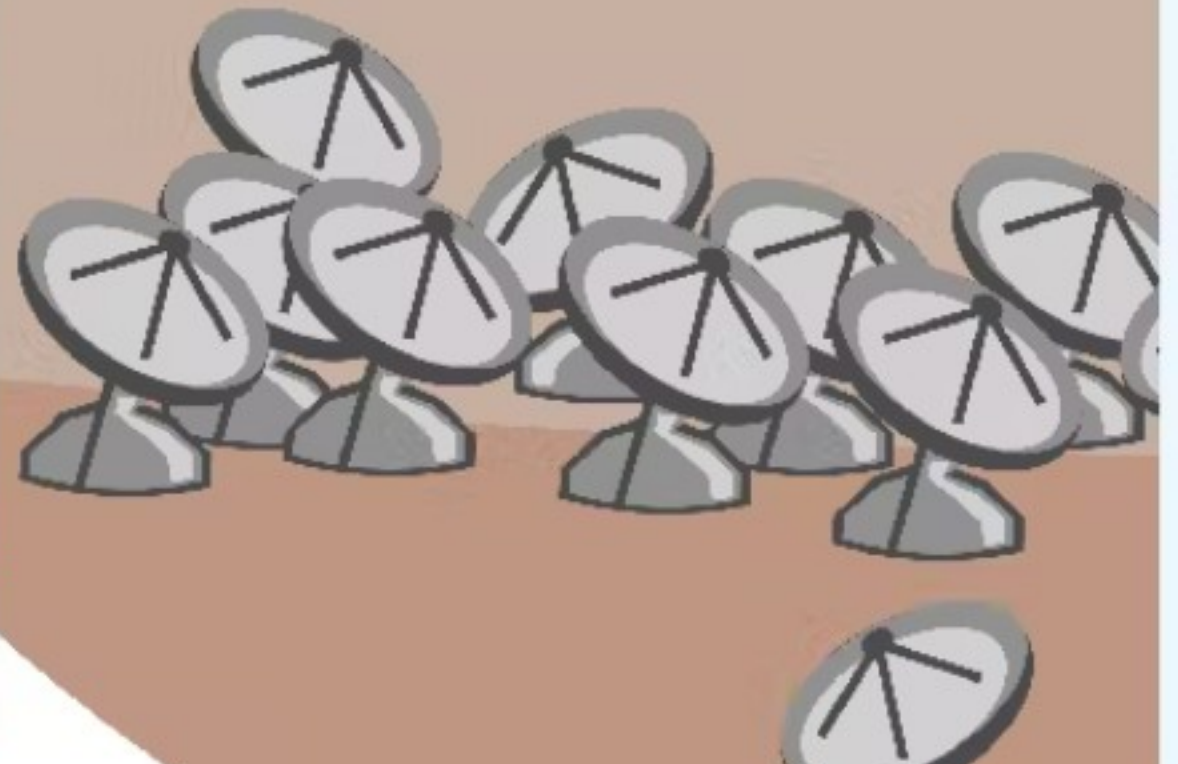
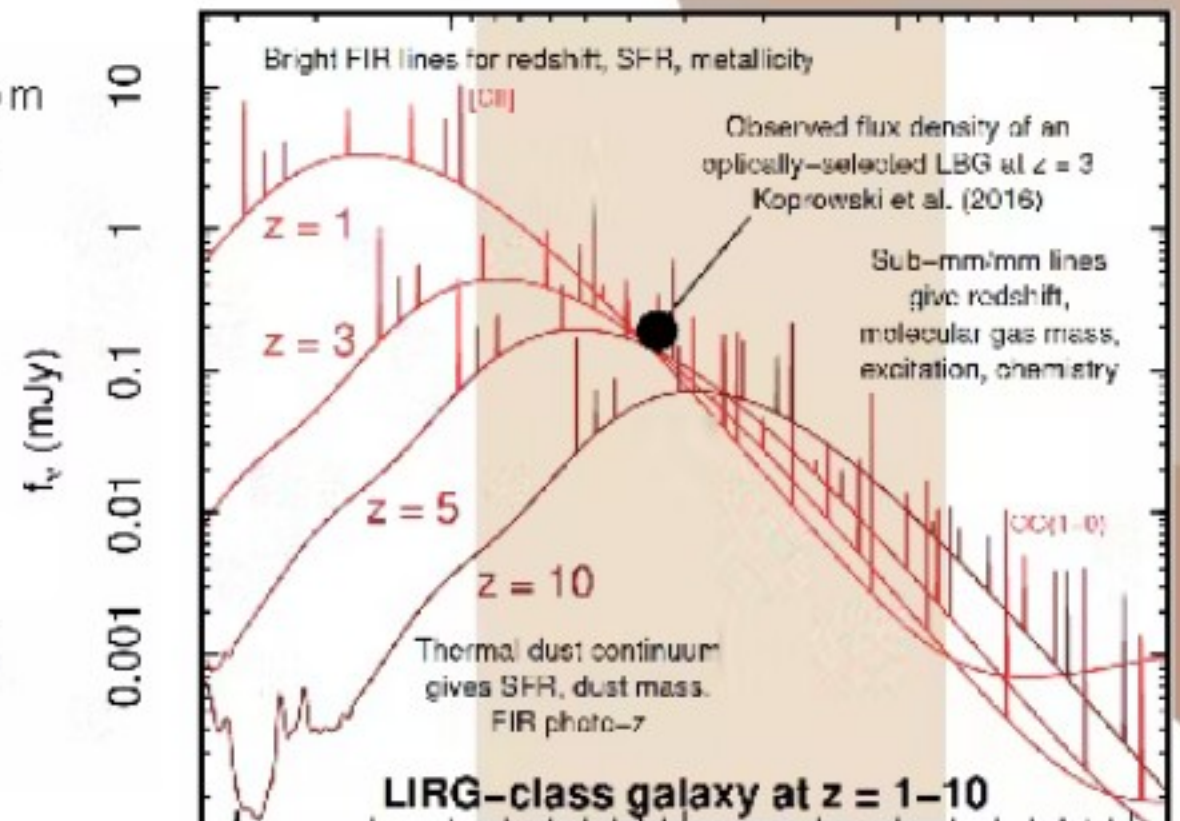


THE SURVEY SCIENCE POTENTIAL OF A “SUB-MM SDSS” WITH ATLAST:

- Perform a complete census of star-forming galaxies at high- z to sub- L^* luminosities
- Reveal the production and evolution of metals in the Universe, as tracked by the dusty ISM
- Determine the evolution of the co-moving H_2 mass density
- Investigate the astrophysics governing star formation efficiency and ISM chemistry
- Chart the growth of large scale structure at the epochs of galaxy assembly
- Detect baryonic acoustic oscillations beyond $z \geq 2$

The figure shows the SED of a star-forming galaxy redshifted through $z = 1$ to $z = 10$, a 2 Gyr timespan from the formation of the first galaxies to cosmic noon. The shaded area shows the wavelength range of AtLAST observations: the wealth of spectral features in this regime will allow the measurement of spectroscopic redshifts for hundreds of thousands of star-forming galaxies. The black point shows the directly detected $870\mu\text{m}$ continuum emission of an optically-selected Lyman-break galaxy at $z = 3$ with a UV+IR SFR of $35 M_{\odot}\text{yr}^{-1}$: AtLAST's synergies with facilities like LSST will allow multi-wavelength, in-depth study of galaxy physics and chemistry on unprecedented scales.

Figure from [1]

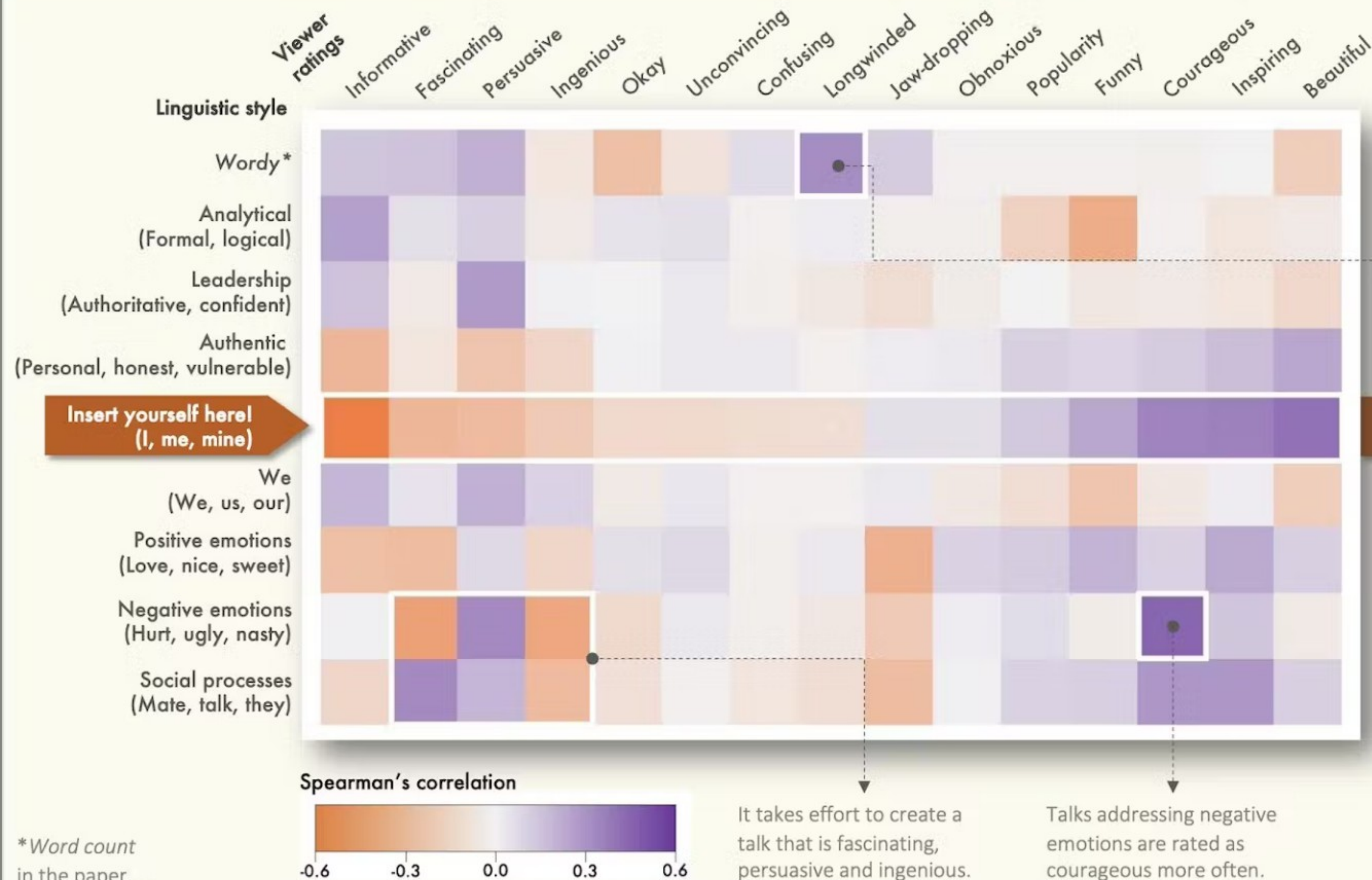


DEFINING THE SCIENCE CASES: GET INVOLVED!

We are in the first year of a 3-year Horizon2020 funded design study for AtLAST, currently compiling science use cases from the community and open to new collaborators. What transformational science could you do with this facility? Let us know!

Find out more at atlast.uio.no
or email: joannaramasawmy@stfc.ac.uk, pamelaklaassen@stfc.ac.uk
or message me, Jo Ramasawmy, during the poster/coffee sessions!

WHAT HAPPENS WHEN YOU INSERT YOURSELF INTO A [TED] STORY?



Insert yourself here! (I, me, mine)

Longer talks tend to be rated as more tedious.

"Talks received emotional [and positive] ratings (i.e., courageous, inspiring, beautiful) when the speaker had a more authentic style, used "I" more frequently, more social and positive words, and fewer words associated with clout." These talks also had more views.

"The central limitation in this study is in assessing the causal mechanisms among language style, language content, and other features of human personality. It should be also acknowledged that the talks themselves are curated to fit into the TED format."

Methods

The transcripts of 1866 talks were analyzed using the Linguistic Inquiry and Word Count program and language variables were correlated with number of views and viewer ratings (all talks from 2006-2017! TED removed the rating feature after 2017)

It takes effort to create a talk that is fascinating, persuasive and ingenious.

Talks addressing negative emotions are rated as courageous more often.

¹MacKrill et al., 2021. What makes an idea worth spreading? Language markers of popularity in TED talks by academics and other speakers. JASIST DOI: 10.1002/ASI.24471



Intro

- 10,000+ posters presented every year
- All use the same 'wall of text' template
- Increasing the knowledge transfer speed of the common template could speed insight & discovery across science.

Methods

- Negative space & large main takeaway helps people quickly find signal in the noise
- A plain-english translation of your main finding is interpreted faster than jargon.
- Introvert bar: Tight summary provides 1-4min of additional detail (away from presenter's personal space).
- QR code links to full paper.
- You can add an optional 'cheat sheet' right sidebar for extra figures and tables.

Results

- Early feedback from people who've used it is extremely positive, including 6 people who won poster awards
- Others have reported more & deeper attendee engagement (better questions)
- We're planning a formal validation study.
- You probably read this summary in less than 2 minutes
- Now you have time left to go read other posters (yay)

THEORY

This poster layout could communicate findings more quickly.



Watch the Cartoon
(includes Templates)

Mike

1



2

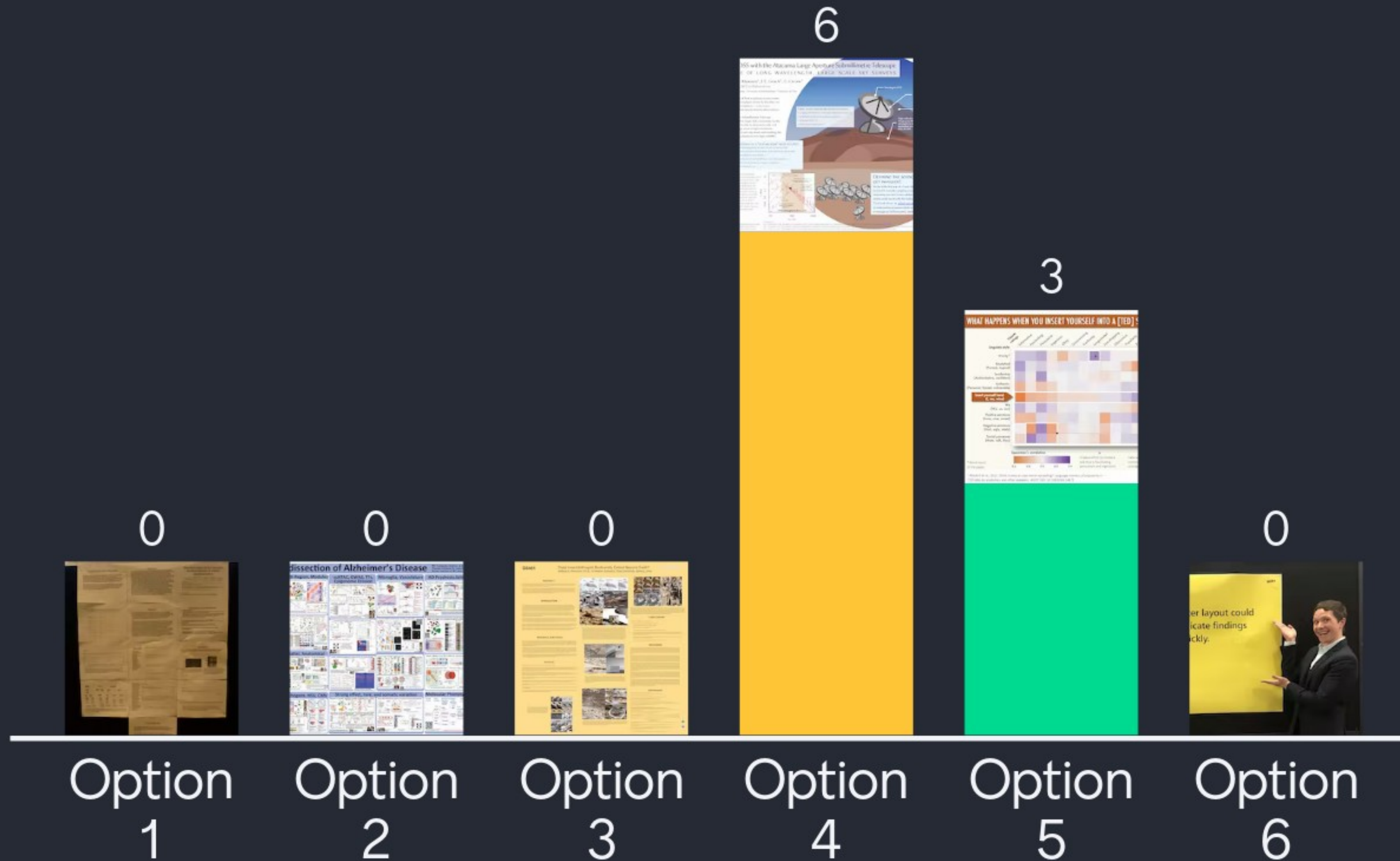


4



Which poster did you think was most effective?

Which poster did you think was the most effective?



Posters are
not papers.



What is the purpose of a poster?

To give a quick overview of a project

To inform while being appealing

The purpose is to grab the viewer's attention while giving adequate information about your research.

Conveying the main ideas of your research, focusing on results and not so much on literature and what has been done already

Prompt questions and discussions about the project, elicit feedback over procedures and plans

Give a first impression of a project to raise interest in it and bring people into a conversation about it

Inform others about your research project

To give basic information, no details

To present a project in a way, that you get to discuss about it with other people

Posters create
conversations.



Effective posters are

- clear
- consise
- carefully designed
- catchy





Michael Bierut How to

How to

use graphic design to sell things,
explain things, make things look
better, make people laugh, make
people cry, and (every once in a while)
change the world. **Michael Bierut**

Thames & Hudson



Think of your
audience.



BETTER POSTERS

Plan, Design, and Present
an Academic Poster

ZEN FAULKES

The amount of effort that people need to put in to getting information changes its relevance for them.

– Faulkes 2021:30



Keep the title short and sharp.

Share the main point of your poster
with a sentence as your title.

Create a headline!

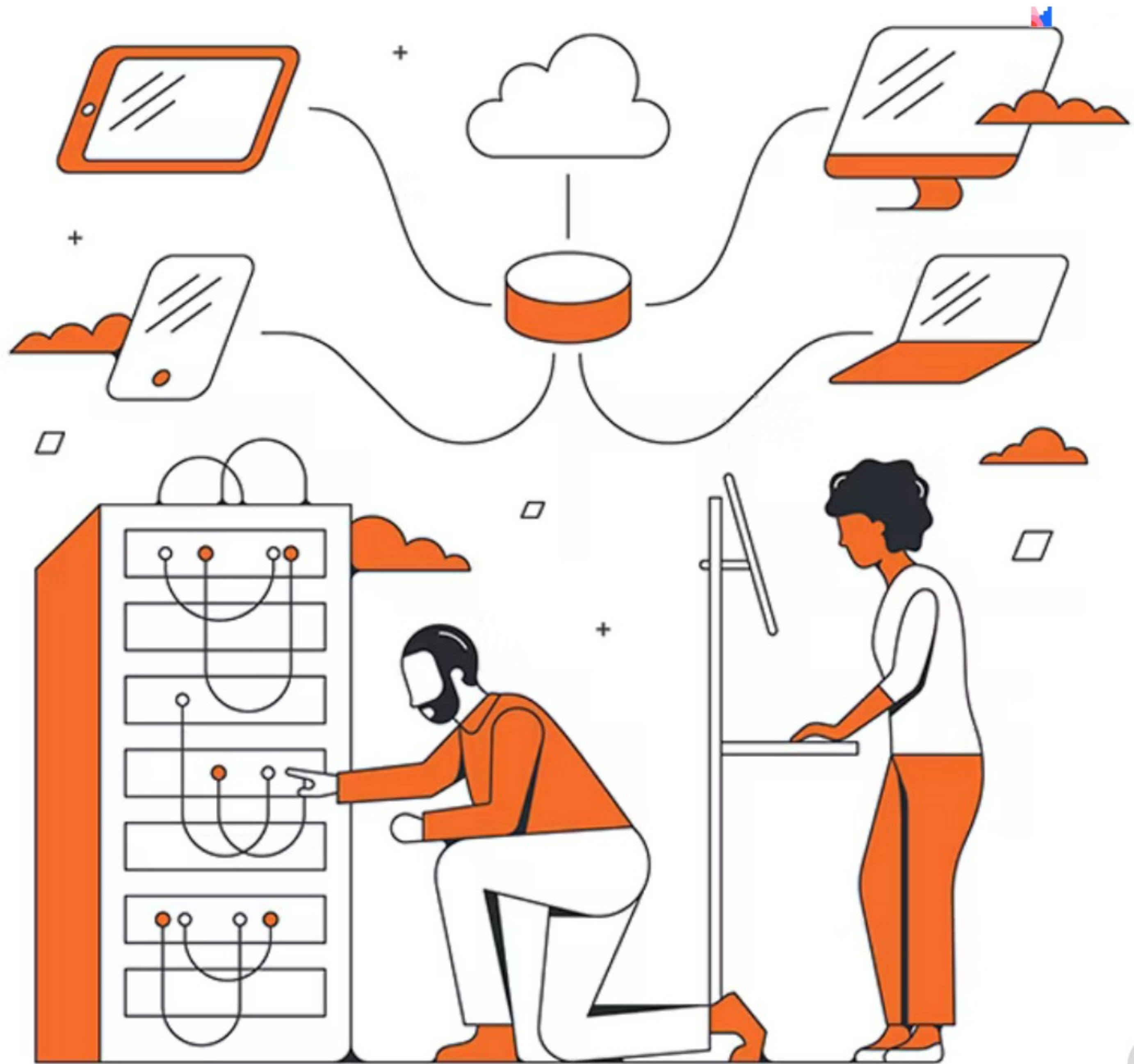
ABT





Write less,
edit more.





Rules of Graphic Design

- repetition
- alignment
- contrast
- proximity



And you will read this last

**You will read
this first**

And then you will read this

Then this one

@LaurelCoons



BILLBOARD ZONE

HOT ZONE

PRIME REAL ESTATE - EYE LEVEL

DEAD ZONE

FINE PRINT

TAKE HOME MESSAGES



Ideas without images are forgotten.

– *Wurman 2001*



Visualisation

- LATCH
- 5W+2H
- Contrast
- Guide







For font's sake, *limit your typefaces.*

Applying lots of fonts not only makes your design hard to read, but what's even harder is finding ones which will actually look good together.



The bigger,
the better.



Let your poster breathe.



Accessibility

- Big text
- Colourblind-friendly
- Sans-serif fonts
- High contrast



**"I LIKE TO BREAK RULES.
I'M A REBEL."**



Instructions



Species boundaries
diversity in the genus

PRESENTER: Spenser Babb-Biernacki

INTRO:
Why do we need to describe new *Pneumocystis* species? This genus of mammalian lung parasites, found in every mammal species tested, can give us insight into host-parasite speciation dynamics at different scales. It has been assumed that there is one *Pneumocystis* species for every mammal on Earth, but only five species have been described, and true species boundaries are not known. Understanding how parasite species boundaries correspond to their hosts can give us insight into their ecology and potential for host switching, but this cannot be done until more species are described and species boundaries are understood.

- METHODS**
1. Collected mtLSU and mtSSU sequences from GenBank
 2. Inferred ultrametric tree using BEAST
 3. Molecular species delimitation: ABGD, GMYC, PTP, and BPP predict *Pneumocystis* species boundaries and how many host species they can persist in
 4. Used host: parasite ratio to predict number of *Pneumocystis* species in existence

RESULTS

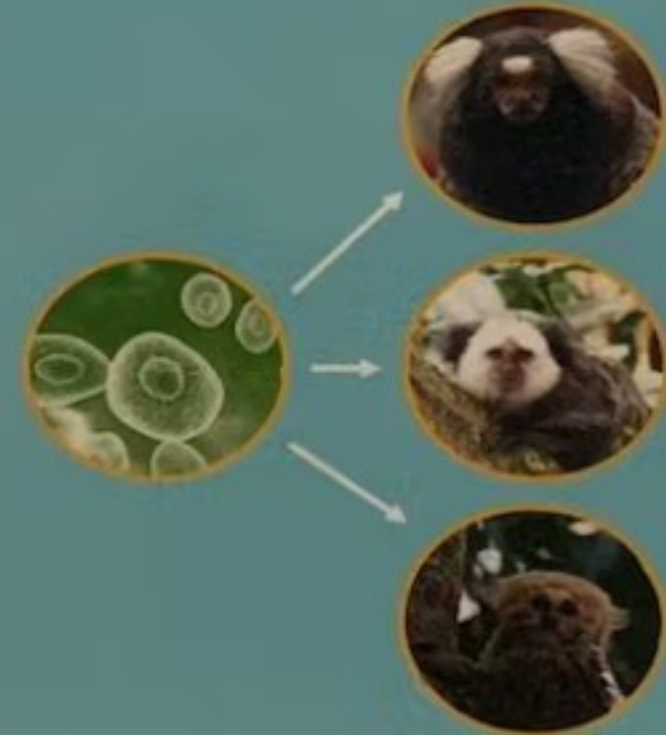
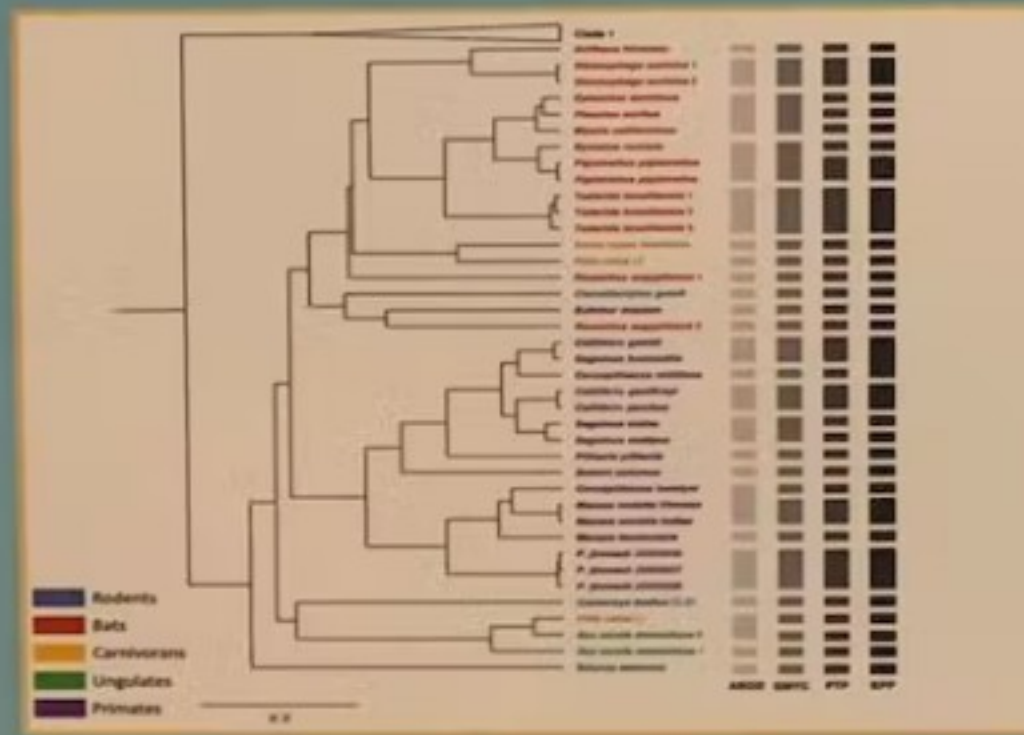
- *Pneumocystis* specificity is likely less strict than the assumed 1:1 ratio. One *Pneumocystis* species can often infect an entire mammal genus.
- 5 species have been described, and we likely have 4,000 to 5,500 to go.

Spenser Babb-Biernacki,
Vinson Doyle, and Jacob Esselstyn.



In *Pneumocystis*, molecular species delimitation supports host specificity mediated by geography.

We predict 4,000 to 5,500 undescribed species.



Tip labels represent the host from which a *Pneumocystis* sample was collected. Gray boxes represent predicted *Pneumocystis* species boundaries based on four molecular methods.

@Babberwocky
of many mammals in the same genus.

What is the greatest barrier to describing the Earth's fungal biodiversity?



Write your answer here!

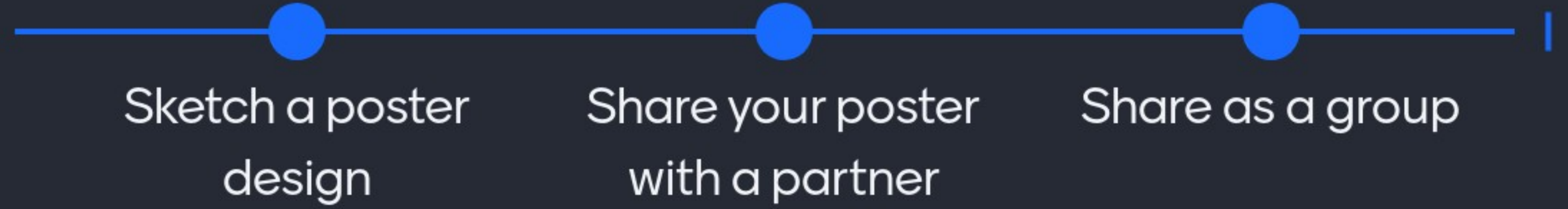
Lack of exploration of diverse niches

Or tweet your response @Babberwocky

Advertise yourself!



Design A Poster



helpful tips



Tools

- PowerPoint
- Canva
- Inkscape
- InDesign/Publisher



Check the
size.



Write a script and practice!



Check for grammar and spelling.



One poster
per takeaway.



Get feedback.

Another pair of eyes will help you to catch any spelling errors and see any problems with the design.



Questions?

0 questions
0 upvotes