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Trade-offs in Computer-aided Biomimetics

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Trade-offs for

Computer-Aided Biomimetics

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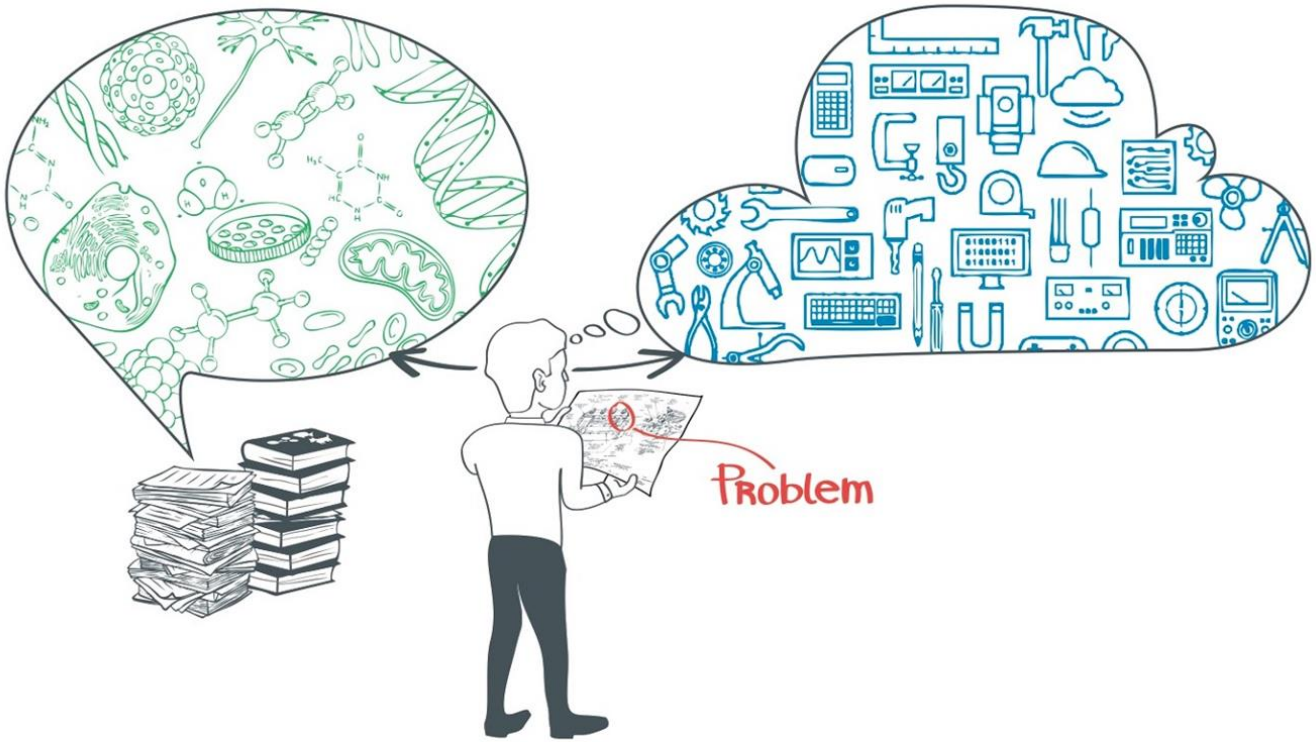
HERIOT WATT UNIVERSITY

NIMC
Nature Inspired Manufacturing Centre

CDT–EI
EPSRC CENTRE for
Doctoral Training in Embedded Intelligence

- Hardly ever trained as biologists

- Incorporate more specific properties
- Increase biodiversity of analogies



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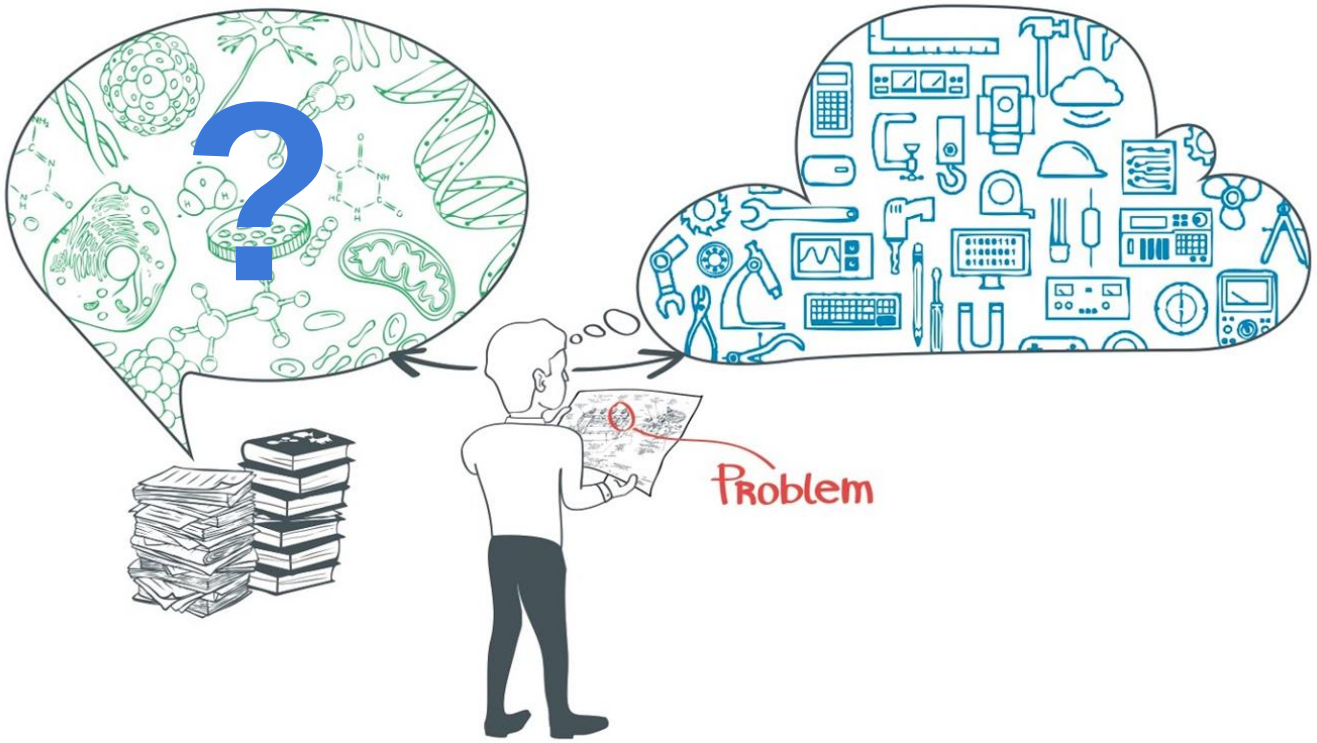
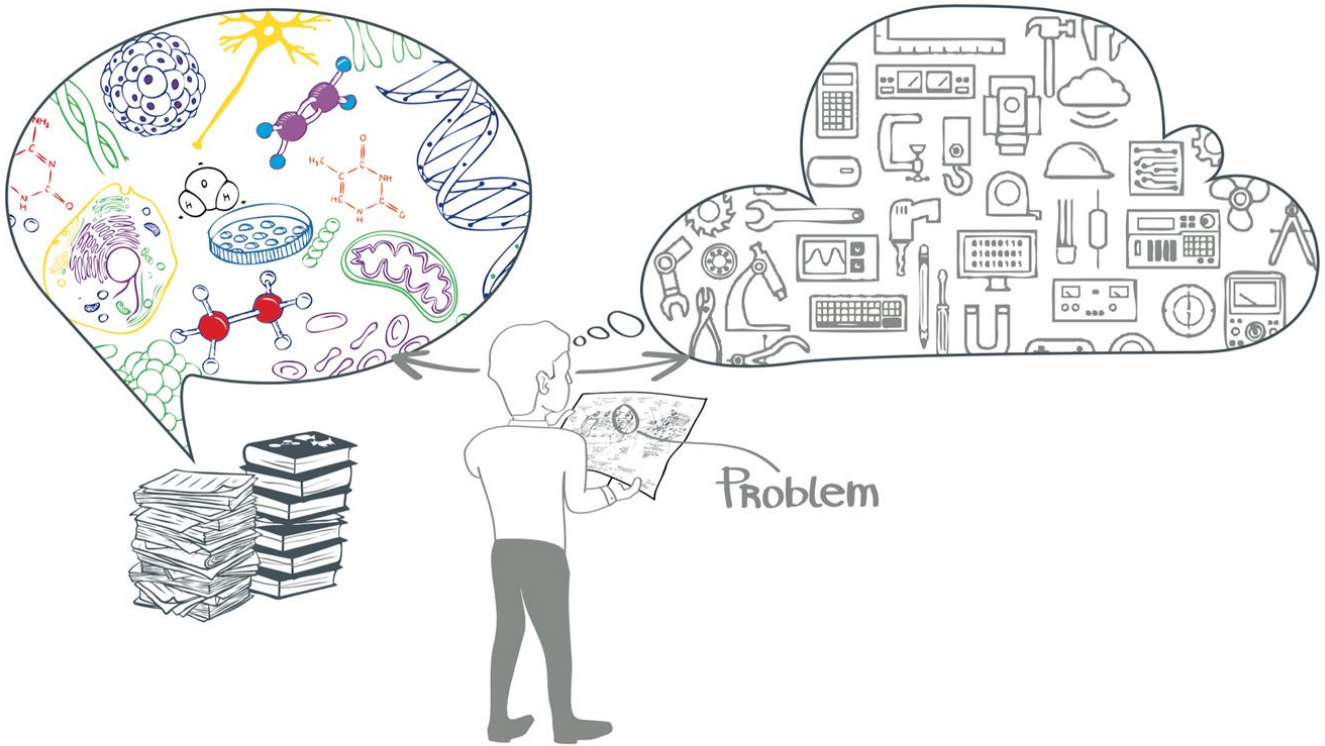
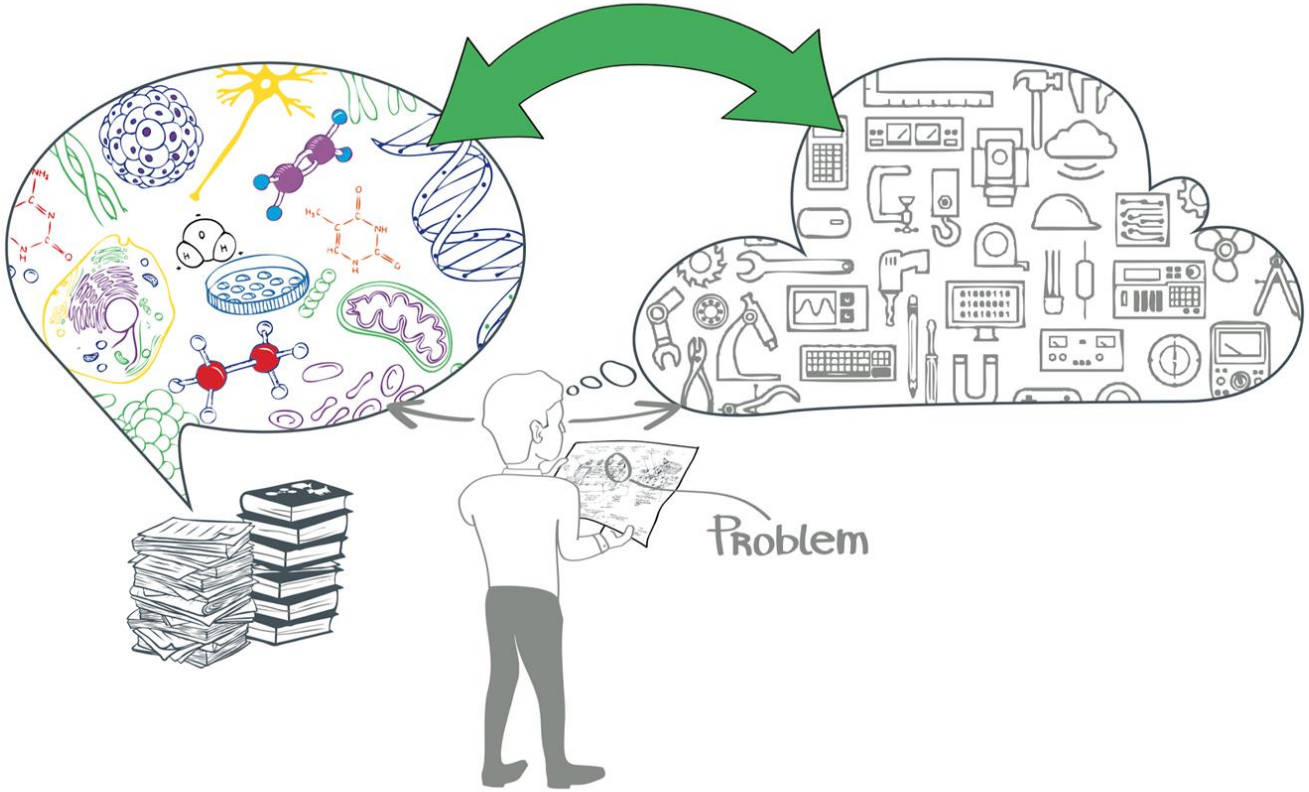
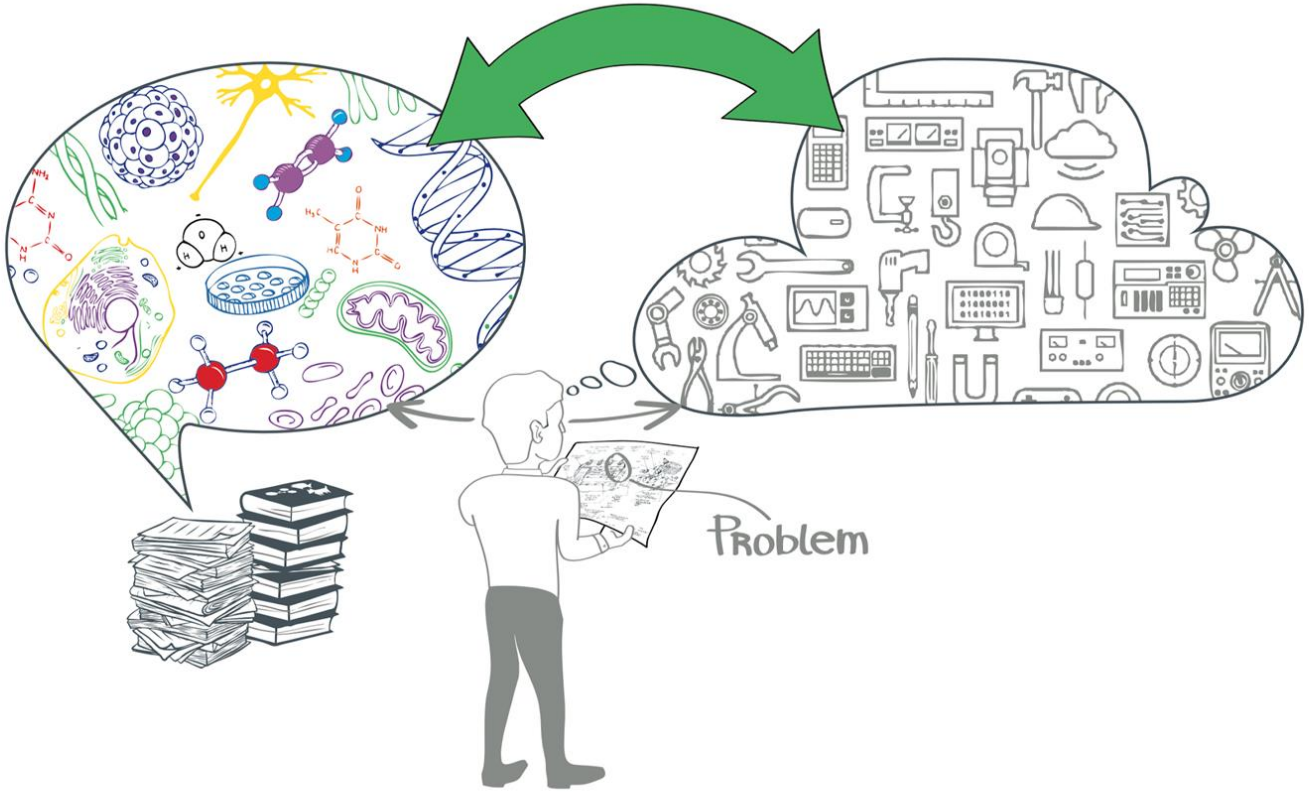
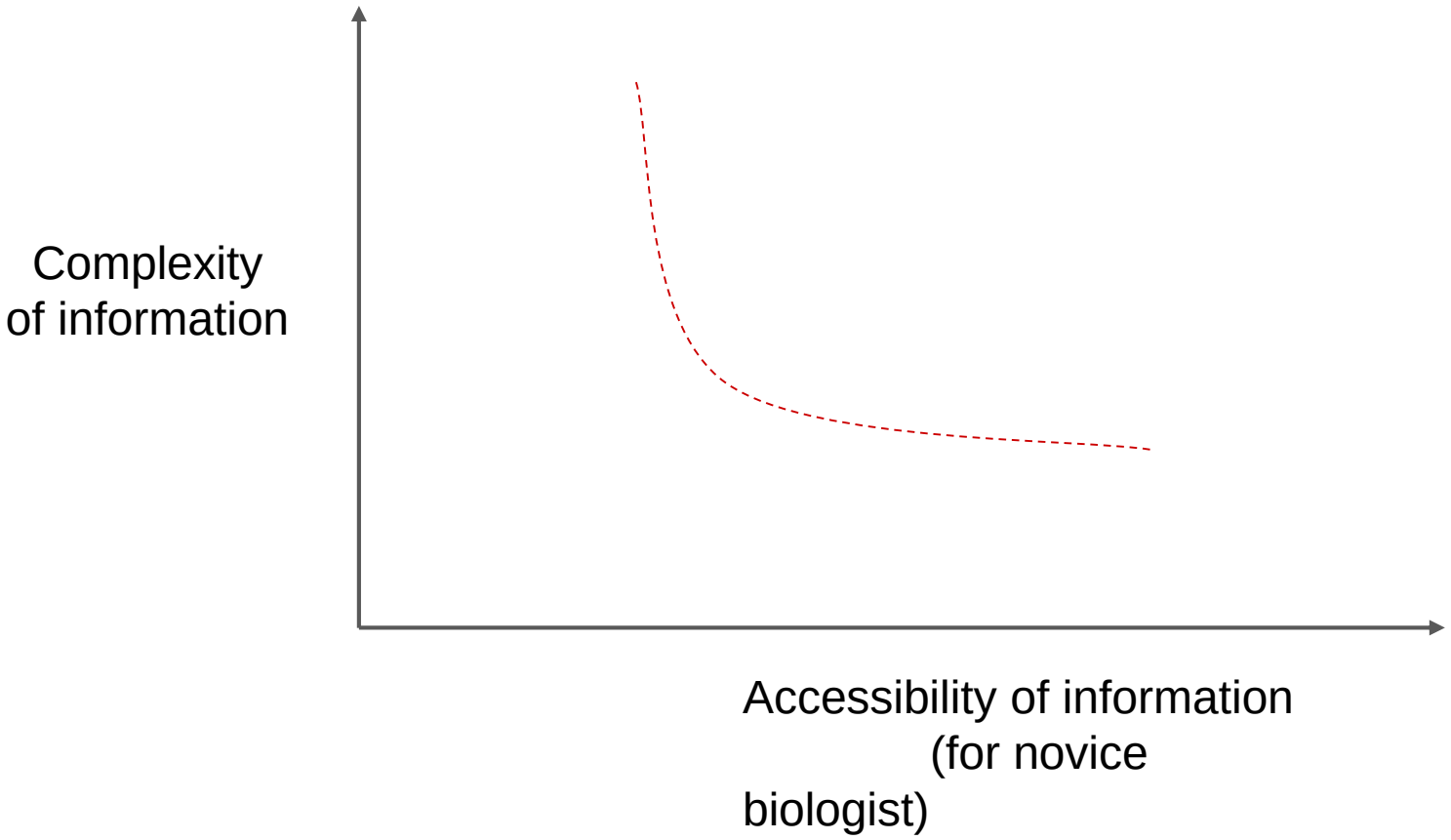


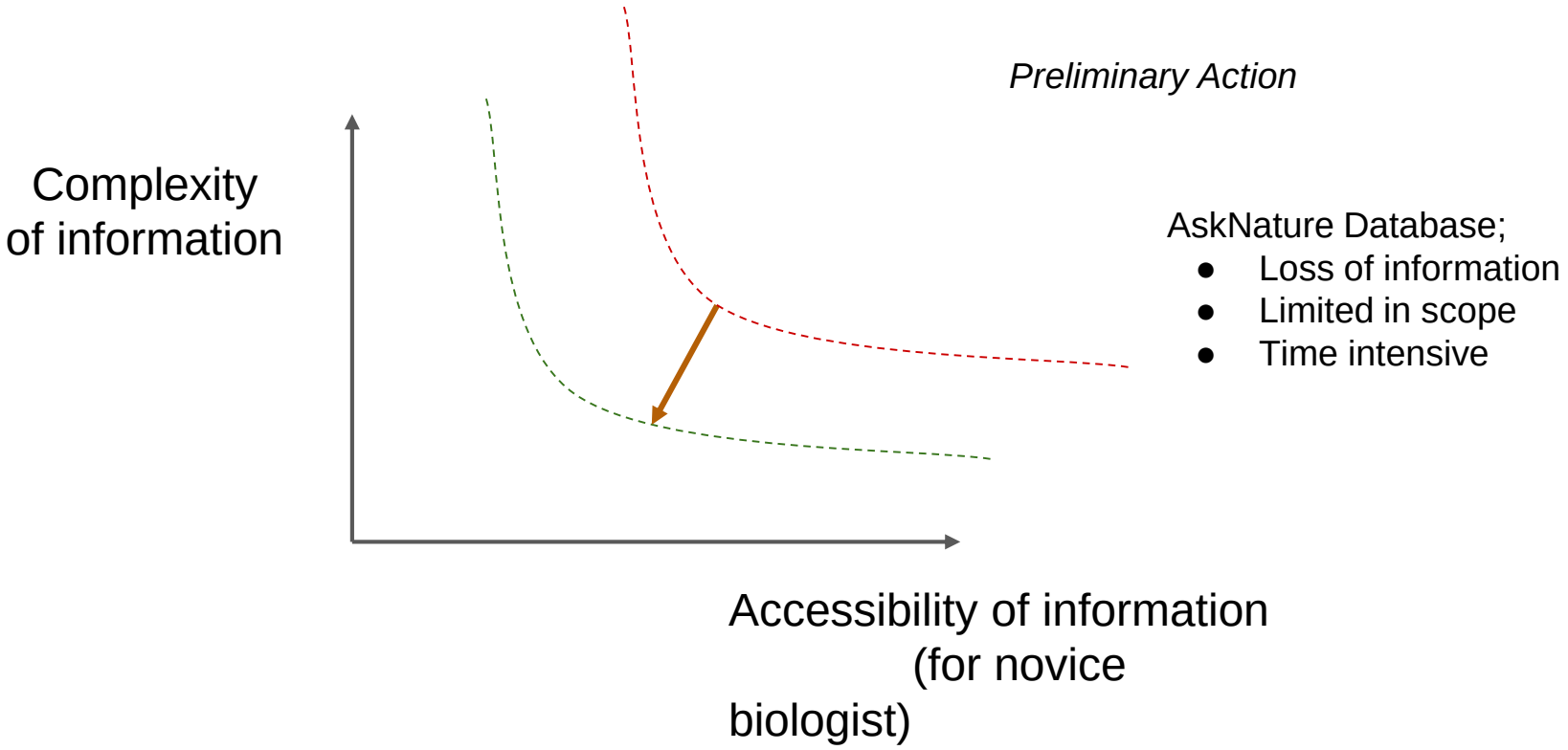

Problem


Problem

Trade-offs

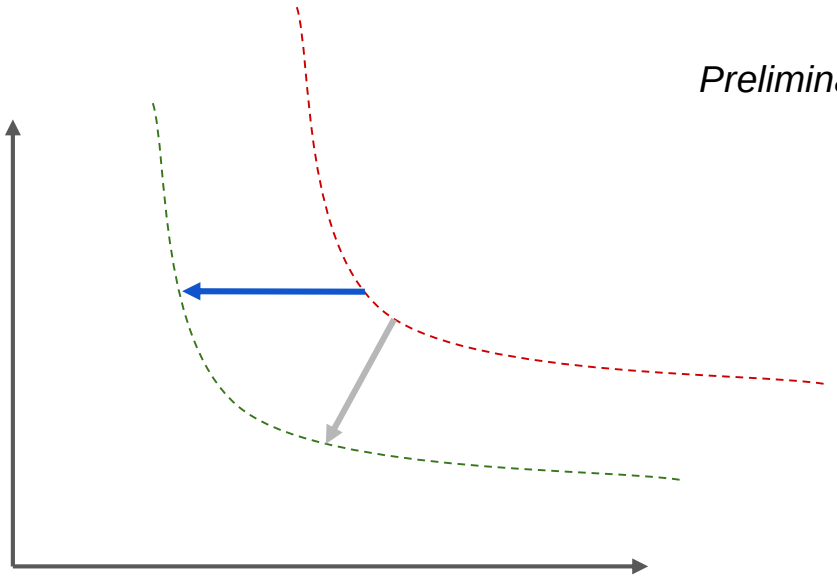



Complexity
of information
Accessibility of information
(for novice
biologist)


Preliminary Action
Complexity of information
AskNature Database;
Loss of information
Limited in scope
Time intensive
Accessibility of information (for novice biologist)

Preliminary Action

Complexity of information



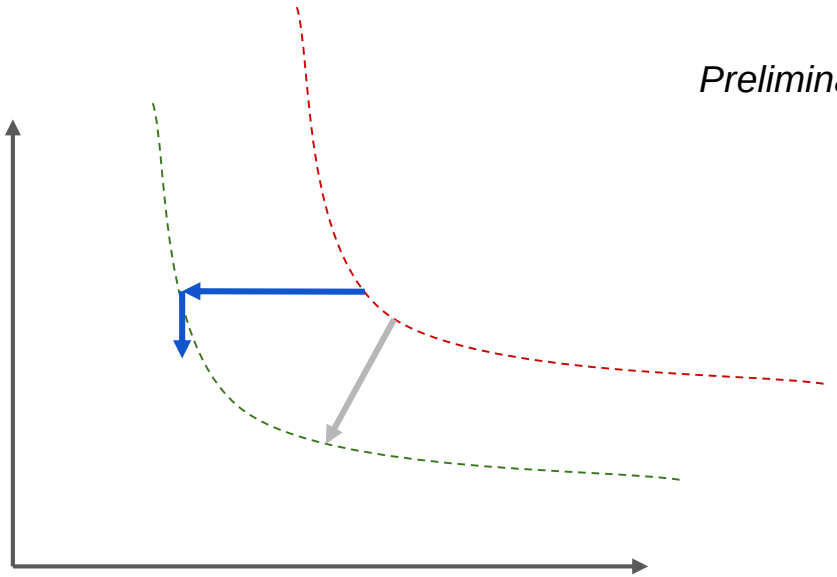
Improve access to scientific biological texts;

- Retain (complex) context

Accessibility of information (for novice biologist)

Preliminary Action

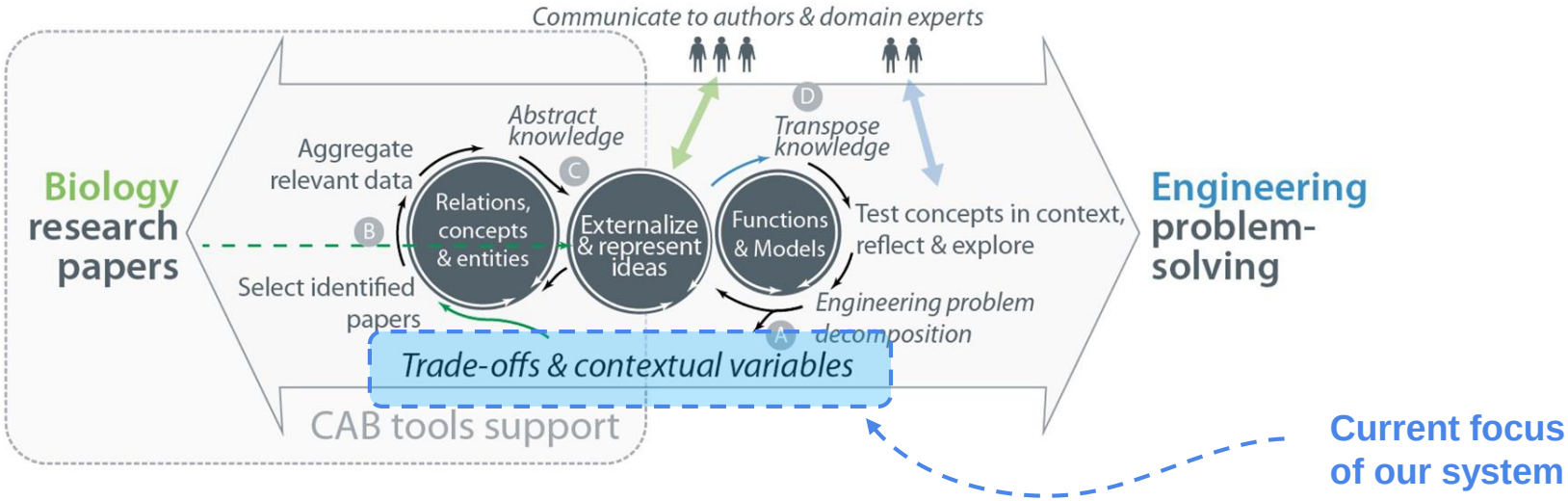
Complexity of information



Improve access to scientific biological texts;

- Retain (complex) context
- Insight relations and concepts

Accessibility of information (for novice biologist)



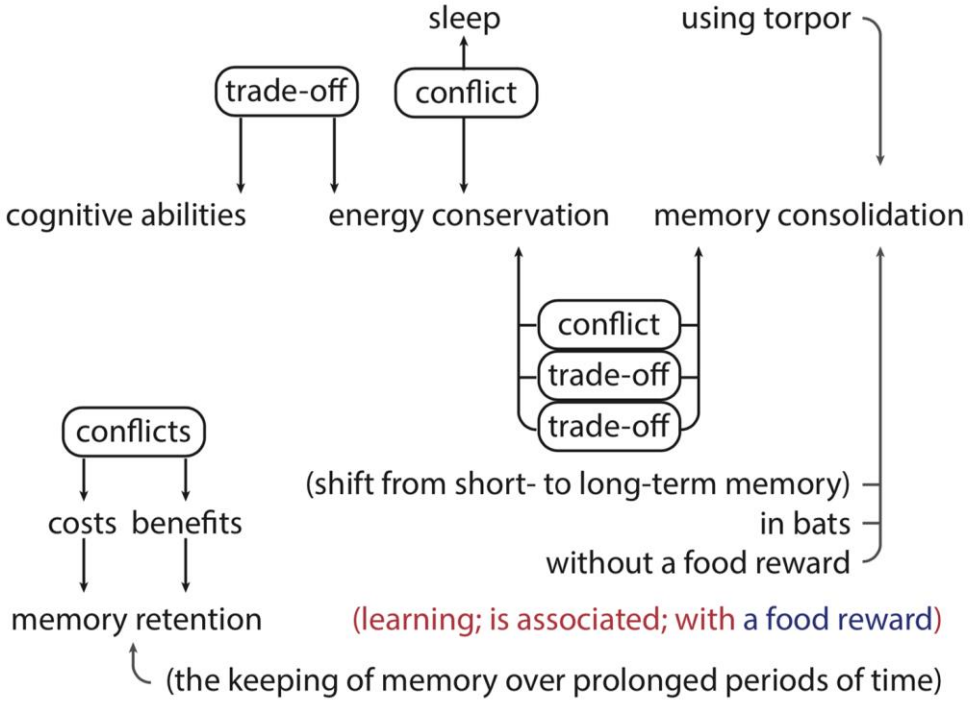
Kruiper et al. (2018) Towards a Design Process for Computer-Aided Biomimetics
Vincent (2016) The Trade-off – A Central Concept for Biomimetics

(Sleep deprivation; has; negative effects on both memory consolidation)

(torpor; has; a negative influence on memory consolidation)

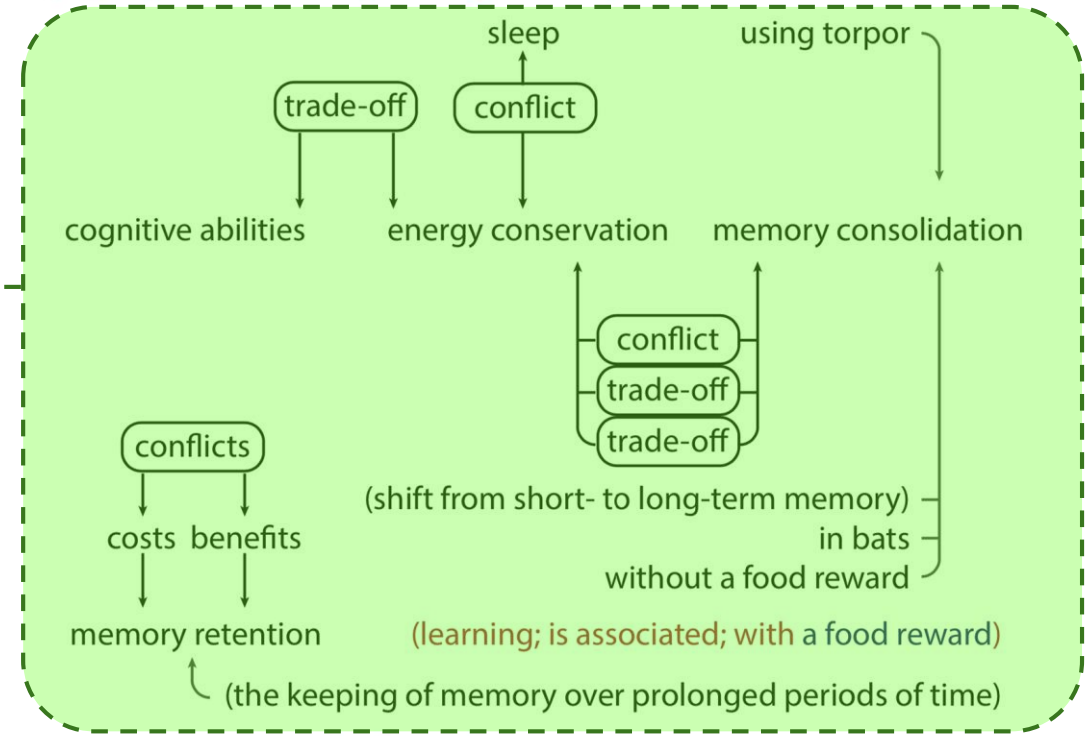
(digestion; prevents; the bats; from falling into torpor quickly)

(torpor ; indeed affects ; learning abilities)



(A memory; is normally formed;
after repeated learning events; sleep enhances this process)

(Sleep deprivation; has; negative effects on both memory consolidation)
(torpor; has; a negative influence on memory consolidation)
(digestion; prevents; the bats; from falling into torpor quickly)
(torpor ; indeed affects ; learning abilities)



Trade-off extraction

Semi-Open
Relation Extraction

(A memory; is normally formed;
after repeated learning events; sleep enhances this process)